GRUMMAN ECOSYSTEMS –

new subsidiary sees world as its field

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plane
GRUMMAN
news

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KSC team preps Apollo 14 for Jan. 31 voyage to moon

KENNEDY SPACE CENTER, FLA. — Kitty Hawk and Antares—that is, the Command/Service Module and the Lunar Module—are getting their "physicals" preparatory to the Apollo 14 launch January 31.

Last week Chuck Kroupa, Grumman's director of Operations here, reported that "LM-8 will be in the midst of a countdown demonstration that's to run through January 19. Prepping for the actual countdown begins the 24th.

"Liftoff is set for Sunday the 31st."

The only "problem" thus far is the absence of any problem. "Everything's going so smoothly it makes me nervous," says one Grummanite. His assessment was backed up by Vice President Ralph Tripp, the man in charge of LM, who says that "We've had less trouble with LM-8 than with any previous one."

In a way, that's to be expected: There's been more time than before to prepare for the mission, and all of the people working on it have experience on previous LMs. So each LM—theoretically—is better than the one before, though after the dramatic flight of Aquarius some nine months ago, Kroupa says, "We must pay meticulous attention to detail.

"The people here at the Cape feel that their hard work and experience have paid off." And so it seems.

On top of that, Kroupa cites the intangible called morale. It's high, he reports. "There was apprehension way back, around September, about further cutbacks in employment; but that was muted quickly as our people realized that our team staffing leveled off and that all four of the remaining Apollo missions are very crucial. There's no margin for error or complacency."

And as Dr. Tripp has said, "Any failure now might have the effect of wiping out all of our successes."

Morale high

These judgments seem well founded. Ask yourself: Does the man in the street have enthusiasm for the space program? Indeed, does Congress? This, unfortunately, is a "down" period, and only more successes can turn the picture around.

That is a real motivator. Tied in with Grumman's Cape philosophy that something can always be done better, it helps to explain why morale and efficiency are high.

The LM crew for Apollo 14 is made up of Alan Shepard Jr., spacecraft commander, and Ed Mitchell, LM pilot. The man who will be orbiting the moon while Shepard and Mitchell are exploring it is Stuart Roosa, pilot of the Command Module.

Apollo 14's mission is basically the same one that Apollo 13 was to have performed—with a couple of new additions. The landing site, Fra Mauro, remains the same, as does a set of experiments and the rock-collection job.

Among the differences are an extended period of EVA (Extra Vehicular Activity), a "thumper" that will make several impacts on the moon in order to determine the type and depth of its crust, a two-wheeled "rickshaw" (Modularized Equipment Transport System) to be towed about on the lunar surface, and a large laser retro-ranging-reflector.

"The last EVA lasted about 2½ hours," said Joe Marino, Systems Engineering manager. "That's to be extended by roughly two hours. And during the second EVA, the astronauts may walk as far as a mile and three-quarters. At that time, the men may pull the rickshaw and load it with rocks and soil samples."

The idea of the thumper is to set up seismic waves—a kind of lunar echo chamber to be read from earth. Also, mortar-like charges will be implanted at several points on the moon's surface and set off months later. These seismic shocks, to be radioed back to earth, should give scientists a better understanding of the lunar structure.

Larger laser

The laser retro-ranging-reflector to be set up on the moon will be much larger than the one already there. It will have some 300 reflecting surfaces to allow scientists anywhere in the world to bounce beams off the moon, thus permitting more and better measurements of earth-moon distances at various times.

The astronauts themselves will be under long-distance medical surveillance during their hours of sleep: An EKG (electrocardiogram) and ZPN (impedence neumogram) will be transmitted continuously from at least one

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Rehearsal. **Alan Shepard, Apollo 14 commander, and Lunar Module pilot Ed Mitchell get in some moon flying in LM simulator at KSC. Scheduled liftoff for astronauts is on Sunday, Jan. 31. (NASA photo)**

Insurance note

There have been times when some people you know have recovered more group insurance money for an illness or accident than the illness or accident actually cost. But that possibility is diminishing, says the Group Insurance office in Plant 28.

Insurance companies have established what they call "Coordination of Group Health Insurance Benefits" to assist in keeping operating costs down. This plan will affect a family where the spouse works for another employer than Grumman and is insured under another health plan than Grumman's. Reimbursement for all medical-surgical expenses to which the man and wife are entitled will be made by the insurers, but the couple will not be able to make a "profit" on the illness or accident by collecting duplicate amounts, according to John Ince, manager, Insurance Benefits & Records.

A leaflet explaining the "Coordination of Benefits" arrangement is available from Employee Services Offices. The Group Insurance office in Plant 28 points out that full benefits are still paid to Grumman personnel enrolled in the Grumman Blue Cross/Blue Shield, or in individual policies, regardless of other insurance payment.

CALENDAR of events

Notice of events for period Jan. 29 - Feb. 12 should reach Plane News by **Tues., Jan. 19.**

Amer. Prod. & Inven. Cont. Soc.: Tuesday, Jan. 19, Holiday Inn, Sunnyside Blvd. & L.I.E. Exit 46, Plainview, 6:30 p.m. dinner. Pat Murphy, GAC, on "Grumman's Real Time Procurement & Inventory Sys." Norm Heilweil, Ext. 1855.

Astronomical Soc.: Wed., Jan. 27, 5 p.m., Plt. 28 Conf. Rm. 2, gen. mtg. Ed Andersen, Ext. 7044.

Chess Club: Tues., 5 p.m., Plt. 3 Cafe, tournament, games. Alex Ikonnikow, Ext. 7592.

Coin Club: Wed., 12:05-12:50, Plt. 25 Vendor Conf. Rms. Ken Hale, Ext. 1936.

Duplicate Bridge Club: Thurs., 5:45 p.m., Plt. 3 Cafe. Reserv. not required, partnerships arranged. Pete Harrington, Ext. 1812.

Ex-Servicemen's Club: First Mon. of month, 7:30 p.m., Plt. 28 Audit., exec. & gen. mtg. Pete Volpe, Ext. 84754.

Fencing Club: Fri., 5 p.m., Plt. 30 Cafe, competitive fencing & instruction. Joe Campisi, Ext. 1134.

GAA Leather Craft Club: First & third Wed. of month, 5-6:30 p.m., Plt. 28 Audit., inst. in leathercraft & new ideas & tech. Cy Dotz, Ext. 86828.

Horseback Rid. Club: Every Sun., 11 a.m., By-Ways Stables, Huntington, Eng. rid. lessons avail. Donna, Ext. 86214. Club meets 1st Thurs. of month, Plt. 28, 5:30 p.m. Caren Carlson, Ext. 2725.

L.I. Ind. Nurses Assoc.: Thurs., Jan. 21, 8 p.m., Plt. 28 Audit., month. mtg. Mrs. Florence Gold, A.C.W., admin. direct. of Nassau County Chap. of Epilepsy Found., on "Epilepsy in Industry." Mary Gise, Ext. 3723.

Retiree Club: Wed., Jan. 27, 1:30 p.m., Holiday Manor, reg. month. mtg., GAA, Ext. 2133.

Rod & Gun Club: Wed., Jan. 27, 8 p.m., John's Oasis, Hicksville. Annual mtg., inst. of '71 officers. Walter Schillinger, Ext. 57-617.

Ski Club: Wed., Jan. 29, 8:30 p.m., Holiday Manor, Hicksville Rd., Bethpage. Bill Flynn, Ext. 1823.

Soccer Club: Sun., Jan. 17, 12:30 p.m., Reserve team vs Lindenhurst, Plt. 3 field, 2:30 p.m., Premier team vs Patchogue, Plt. 3 field., League & cup games. Karl Herrnkind, Ext. 84181.

Soc. of Plastics Ind.: Tues. - Fri., Feb. 9-12, Shoreham Hotel, Wash., D.C. Engineering papers exhibit. G. Lubin, Ext. 1717.

Stamp Club (Bethpage): First 3 Wed. of month, 5 p.m., Plt. 30 Cafe., swapping, circuit bk. sales, auctions. Marty Harow, Ext. 9172.

Toastmasters Club (Huntington): Mon., Jan. 25, 8 p.m., Allstate Bldg., Melville, 1st Fl. Conf. Rm., 2nd & 4th Monday of month, educational & public speak. T. Campbell, Ext. 3157.

Wgt. Watch.: Every Tues., 4:45-6:45 p.m., Plt. 28 Audit. Mimi Ackerman, W.W. lecturer, Lee Badalamenti, Ext. 2171.

About the cover

Small area of Connecticut is seen in this blow-up of aerial map made by Grumman Ecosystems last summer. Side-looking radar, unaffected by time of day or prevailing weather, was developed for military operations. Its peaceful uses include mapping to show geological and structural features in an extended area.

Call rescue team 'magnificent' following F-14 crash at Calverton

One of the first to go into action when he learned that No. 1 F-14 might be a stricken bird on December 30 was Chuck Wells of Flight Operations at Plant 7, Calverton. He moved quickly and professionally — as did some 50 others at the scene.

Others, outside of Grumman—a local hospital staff, local and State police, and the U. S. Coast Guard, to mention a few—were either alerted or on their way to Calverton.

All had one primary concern—to save the lives of the two Grumman test pilots flying the No. 1 F-14 at the time.

Airport manager Bill Rasmussen spoke of the result of that concerted emergency effort: "The people responded magnificently. They were just great! And it all proves that the best way to operate in a crisis is to follow a written, predetermined plan."

That's the way it went. Jobs were performed in accordance with a "script" that lays out procedures in fine detail. "When you do it that way," Bill says, "the people responsible for acting don't have to wonder or debate about what to do next. The plan takes the pressure off them." How true that was!

Once Bill Miller in the cockpit and Chief Test Pilot Bob Smyth were aware that their plane was leaking hydraulic fluid—one of the three chase planes reported it as Miller saw one of the two hydraulics-system gauges fall back to zero—they turned and headed back to Calverton airport. The crew and the chase planes weren't the only ones to know there was trouble. Their conversations in flight were monitored by both the tower and Wells.

On alert

As Wells listened in on the developing problem in the sky southeast of Calverton, where No. 1 F-14 was 14,000 feet over the Atlantic Ocean, he alerted key people in Grumman "just in case:" helicopter pilot Barry Brandow and his rescue crewman, Andy Anderson, who were flying about midway between the F-14 and the Calverton field (and who had Medical Director Dr. Bob Jessup aboard), the nursing staff, Plant Protection, Security, and, of course, the Navy. The tower contacted Grumman Fire Chief George Rose.

Near the F-14 as it turned toward home was a Coast Guard helicopter ready to help if needed.

As Brandow in his 'copter flew from over-sea to over-land position, he looked up and sighted the F-14, almost directly above him. Two of the chase planes—an F-4, and a KA-6D,—"stuck right with the F-14." And Brandow wished his 'copter could move a little faster. A little later, he yelled:

"What the hell's that smoke?"

F-14 had crashed in full view of those on the ground, although Brandow was too far away to see it.

The tower fixed the location, north of the expressway, in the woods, about one mile south of runway approach 32.

The Grumman fire department was then speeding toward the crash scene, and Wells ran down his checklist (after the pilots ejected)—those he had called before **plus** the emergency room of a nearby hospital, State and local police, and the Manorville Volunteer Fire Department.

As Brandow got to the scene for his Search and Rescue mission, the 'copter hovered overhead. He spotted Smyth's 'chute in the trees, but **Smyth wasn't in it.** He looked for Miller, who gave him the "thumbs up" sign, and he renewed his search for Smyth—and found him running from the flames and smoke behind the stricken plane. And he dropped off Dr. Jessup, who wanted to find out, quickly, the condition of the pilots.

Rescue team

Meanwhile, 10 men in seven trucks rushed to the crash scene. "Tom Attridge had gone down in an F-11 in about the same spot 14 years ago," said Fire Chief Rose, "so we knew how to get there fast." But it wasn't easy, and a portable power saw did its job of cutting through trees to get to the site.

"We got there in about five or six minutes," Rose said. "It took 10 minutes to knock out the fire. We used foam and water. Then it took about 45 minutes more to cool the wreckage. And Manorville was there on the spot, and they kept replenishing our water supply."

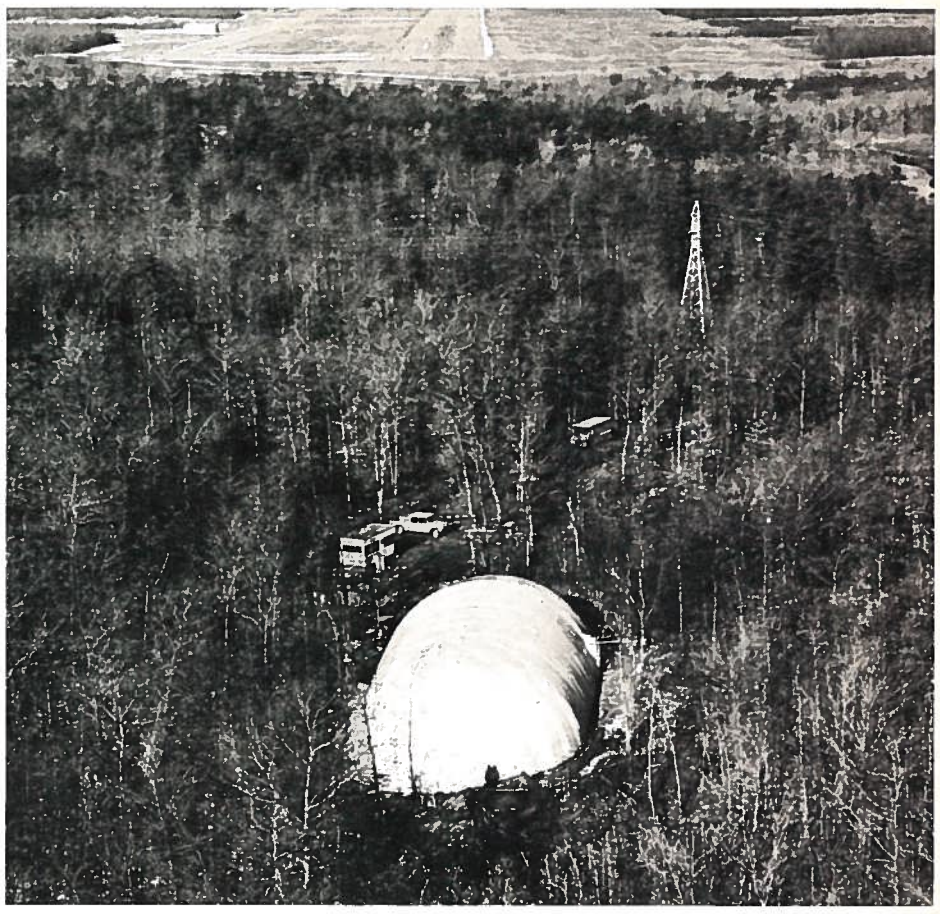
Once the fire was quelled, Grumman's biggest fire truck was sent back to base so that the rest of the Calverton area was protected.

Capt. Mike Suspenski's guards at Calverton, had, in the meantime, roped off the area and, in cooperation with State and County police, kept highway traffic moving.

And once it was determined that Miller and Smyth were in good shape, Wells was back on the line to the hospital's emergency room to announce all was well.

While Smyth and Miller were being checked out physically by Drs. Jessup and Roy Fagin, yet another problem was on Rasmussen's mind. Weather reports indicated an approaching snowstorm. Since it was essential that wreckage of F-14 No. 1 not be moved until Navy investigators had thoroughly inspected what was left of the aircraft, it was a ticklish situation—one solved by Facilities Maintenance by renting a bubble-like tent. As far as Rasmussen knows, this was the first time that wreckage of an aircraft has been protected by a cover. (And by the way, a snowstorm did come.)

"Looking back on what happened," Rasmussen said, "the cooperation we got from everybody was fantastic. And I want to point out especially the wonderful work, under stress, that the photographers did—from the beginning of the flight right through to the aftermath. They were excellent, superb!"



New bubble. **With the prospect of snow racing in, Facilities Maintenance rented a bubble-like tent to protect F-14 wreckage for Navy inquiry.**

Capt. Yates heads accident board

The Navy has convened a six-man Accident Board, headed by Capt. Andrew Yates, NAVPLANTREP, to determine the causes of the crash of the F-14 December 30.

The Board's report is expected to be delivered within the month to Rear Adm. K. C. Childers, NAVAIRSYSCOMREP, Atlantic, Norfolk, and then to Rear Adm. Tom Walker, Commander of the Naval Air Systems Command, Washington, D. C.

A parallel investigation is in progress at Grumman. That study is being directed by Senior Vice President Grant Hedrick.

All information concerning the accident—in which both Chief Test Pilot Bob Smyth and Bill Miller escaped unscathed—is under a tight security lid until Admiral Walker announces the results of the inquiry.

The Company is, of course, providing the Navy investigators with all data pertinent to the crash. There is close cooperation between the two.

The crash occurred during the second flight of the F-14. (A full account of the accident appeared in a Plane News "Special Report" on December 31.)

The first flight, which lasted about nine minutes, was uneventful as the aircraft made two passes over the field at Calverton and landed smoothly. The flight had been shortened because of approaching darkness.

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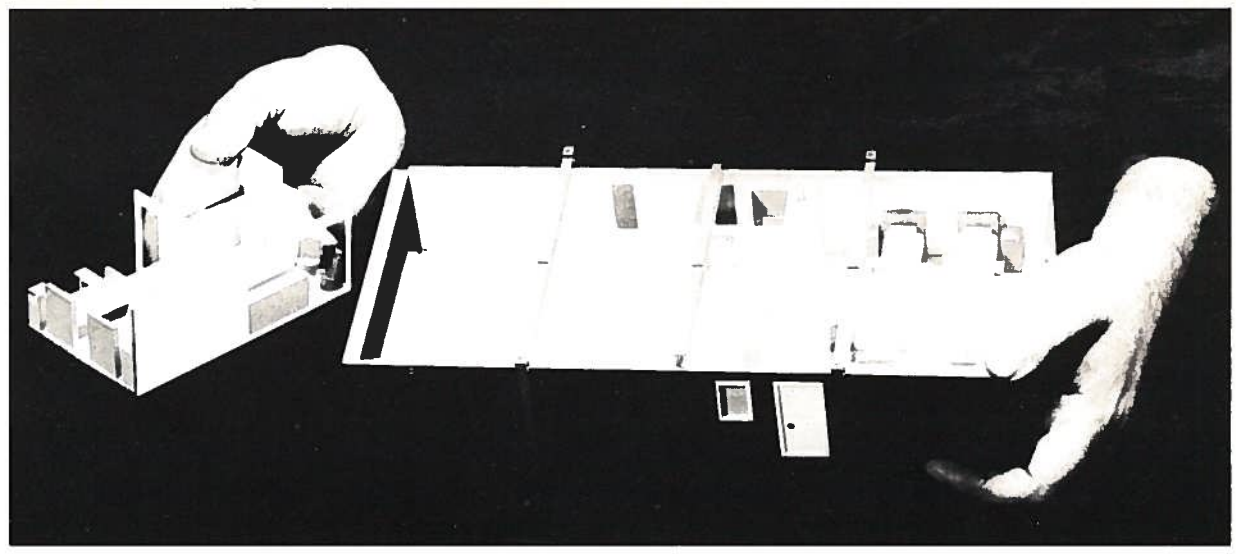
Photo record. **Dick Sander of Presentations Services films area where F-14 crashed. Photos taken before, during, and after second F-14 flight serve as evidence of what occurred for the Navy and Grumman investigating teams. (Photos by Jerry Costello)**

Space spinoff — Grumman developing equipment, facilities to meet medical needs



Scale models. **Members of Grumman Aerospace Medical Dept. and Grumman Allied are working to develop marketing ideas for Grumman modular housing units and Grumman Motor Homes. Photo shows a modular housing unit, flexible as to arrangement, that could be used as an addition to a hospital. Or the housing unit could be a clinic, with medical vans, a development of Motor Homes, backing up to it with dental or X-Ray or emergency equipment to care for patients far from full-scale medical facilities. (Photo by Nat Scherer)**

Grumman Aerospace has turned its knowledge of aerospace systems and engineering to medical and surgical uses. Heart and cancer victims and certainly "ordinary" people as well will benefit from this spinoff.

The Grumman Facility in Houston has been advancing on three fronts. Its latest medical development is a $50,000 contract for two operating room consoles, ordered by St. Joseph's Hospital and Medical Center in Phoenix, Ariz. The Grumman medical team at Houston is to design, manufacture, and install these consoles in a new heart research wing in the Arizona Heart Research Center.

"Our first contribution to the new Grumman product line was ESOT, the Extra-Systemic Organ Transporter for transporting a live donor heart to its recipient," said Jack Buxton, Grumman's Houston Facility manager. "Then we developed MICOT, a Mobile Intensive Care Operating Table, designed to support patients suffering from cardiac arrest.

"Our third development, the Operating Room Console ('ORC,' if you insist on an acronym), gets rid of the wires and tubes and cables that often clutter an operating room. One master console, at which one person sits, is the nerve center, combining controls for anesthesia systems and a hyperthermia (treatment by induction of fever) system, for monitoring the patient, for electro-surgical and microwave blood warmer systems."

At Bethpage, in a program called Advanced Medical Product Development, Dr. Roy Fagin of Medical heads a team working to develop a Medical Support Van System. Associated with the team are Grumman Allied Industries and, for world-wide sales, Grumman International.

Mobile units

Last week Dr. Fagin and his associates presented to the Nassau County Medical Center a proposal for the Center to take mobile health care units to outlying areas and thus avoid the need of duplicating expensive diagnostic equipment. The suggestion was to convert Grumman Motor Homes to medical vans, while using a version of Grumman Allied's modular housing as a "waiting center" for clinical patients.

As Dr. Fagin outlined the concept, "This would be known as a Modular Clinic/Hospital Program to develop medical clinics and hospital extension systems: wards or intensive care units, for instance.

"The program involves the development of a health care delivery system, based on the idea of establishing **fixed site** clinics in a geographic area," he explained. "Medical vans carrying most of the important medical equipment would travel from one clinic to another in a scheduled fashion. Upon arrival of the vans at the clinic, docking ports would permit patients to go from the clinic waiting room through the docking ports and into the vans for diagnostic tests and treatment."

Another possible adaptation of Grumman Allied Motor Homes: a self-contained van for any one of a variety of preventive medicine uses—X-Ray, laboratory, dental, emergency treatment, among others. If successful, this mobile line of products would be distributed world-wide. Grumman is associated with Stony Brook and Nassau County Medical Center on plans for these mobile vans.

Cancer detection center

Dr. Fagin's group reported the recent sale of such a self-contained mobile unit to be built by Grumman Allied for use as a cancer detection center. Delivery to the Stella and Charles Guttman Breast Diagnostic Institute, Inc., of Manhattan, is scheduled for May 1.

Two other programs under study in Grumman's Advanced Medical Product Development Program would improve life for cerebral palsy victims:

- Design and development of prosthetic devices to assist limb movement and locomotion of the physically handicapped—particularly CP patients.
- Special training for CP victims while being transported to and from their CP centers. This project, planned in cooperation with the Board of Control & Educational Services (BOCES) and CP centers, will try to put their travel time to constructive use.

Other projects of the Bethpage medical group: plans for using Grumman Allied modular housing units to create hospital wings; development of new techniques for using lasers for surgery; using optical patterns for cancer detection.

"In Grumman's constant concern with future business and community progress, the medical field looks very promising, here and abroad," Dr. Fagin said. "We benefit greatly from Advanced Civil Systems' studies and concepts, as well as the Company's aerospace and aircraft advanced technology, and we hope the combination will open new avenues for Grumman in this decade."

C.U. meets

The annual meeting of Bethpage Aircraft Federal Credit Union shareholders will take place Thursday, January 28, at 5 p.m. in Plant 3 Cafeteria. The news of an increase in interest (now 6%) has already made Credit Union savers happy.

Business to come before the meeting will be the statement of condition and the election of directors and members of the Credit and Supervisory Committees. Refreshments will be served.

Moon rocks on display

Have you ever seen a moon rock? If you haven't, and you work in the Bethpage area, you'll soon be getting your chance.

According to Mrs. Joan Cable, acting president of the Bethpage Community Advisory Council, the National Aeronautics and Space Administration has agreed that lunar rock samples can be shown at the Bethpage Public Library from February 18-25. In addition, Grumman will have an accompanying display, including a scale model of the Lunar Module, for public viewing.

Visiting hours for the exhibit will be from 10 a.m. to 9 p.m. every day except Thursday, when the display will open at 11:30 a.m. On Saturday, the library closes at 6 p.m. The Bethpage Public Library is located on Powell Avenue between Broadway and the Seaford-Oyster Bay Expressway.

Seek 'special' donors for kids

Shingles is a painful affliction. If you have it, you know that. But it can create a chemical substance in your blood that might save a child's life.

So . . . if you have now, or have had within the past three weeks, a case of shingles, your blood plasma is wanted by Nassau County Medical Center at Meadowbrook Hospital. A donor will be paid $25 if a resident of Nassau County, $35 if a Suffolk resident, for a pint of blood. (The extra $10 is recompense for travel). Donor requirements:

- Have now, or have had within past three weeks, the disease called shingles.
- Are between the ages of 18 and 65, inclusive.
- Have not had hepatitis in the past two years.
- Have no history of malignant cancer.
- Have not been on malaria drugs for past six months.

To make an appointment at Meadowbrook Hospital, call 542-2464 and ask for Dr. Ross or Dr. Rodriguez.

"We have close ties with the Long Island medical community," says Dr. Roy Fagin of the Grumman Medical Department. "This is a comparatively new treatment for children with certain diseases and it is worthy of our help."

Receive second Cogswell Award for outstanding security

When Vice President Tom Rozzi accepted the Corporation's second James S. Cogswell Award for outstanding achievement in industrial security, it put Grumman in very exclusive company. Only one other firm, General Dynamics of Fort Worth, has ever achieved the Cogswell award twice—and the second one, like Grumman's, was for 1970.

The award, named for the late Col. James S. Cogswell, first chief of the Office of Industrial Security, was presented last month at Plant 5 to Rozzi, who is director of Security and Personnel Services. Although more than 13,000 firms involved in classified contract work were eligible for the honor, only 19 were chosen for the award—with Grumman and General Dynamics the first two-time winners.

Officials of the Defense Supply Agency singled out Grumman "in recognition of sustained outstanding performance of administration of the Department of Defense industrial security program, thereby significantly contributing to the national security of America."

Praise from Evans

Notification of Grumman's selection brought this comment from President Lew Evans:

"Tom, this is great—our compliments to you and your entire staff! This is the sort of thing that helps to keep Grumman on top. Many thanks, Lew."

Following the presentation of plaque and certificate to Rozzi, Brig. General Louis Schelter outlined some areas in which firms are evaluated for the Cogswell Award:

- Degree of security consciousness by management
- Security education and motivation programs
- Self-generated inspections of security practices
- Reviews of security procedures in organization's publications
- Adaptation of new security methods

The award was instituted four years ago to promote greater awareness of the need for improved security practices in industry.

Earlier awards

Earlier, Grumman was presented with the Navy Security Achievement Award in 1964, received the first Cogswell Award in 1966, and in 1970 earned the Civil Defense Industrial Preparedness Award for the 15th consecutive year.

"We're very proud to share with General Dynamics the honor of being selected the second time for the Cogswell Award," Rozzi said. "Our Plant Protection and Security departments deserve praise for their efforts in this program, and we certainly recognize contributions of individual Grummanites to our security program; their understanding and cooperation have made it successful."

DEFENSE SUPPLY AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22314

IN REPLY REFER TO DCAS-N

Mr. Llewellyn J. Evans
President
Grumman Aerospace Corporation
South Oyster Bay Road
Bethpage, New York 11714

Dear Mr. Evans:

In September 1966, the establishment of the James S. Cogswell Outstanding Industrial Security Achievement Award was announced by the Defense Supply Agency. The purpose of the award is to give special recognition to those contractors who have demonstrated outstanding achievement in the Defense Industrial Security Program from the approximately 13,000 defense contractors.

Extremely high criteria were established, for it was, and still is apparent that the great majority of industrial firms evidence their security responsibility by conducting excellent programs. Nominations for awards were made by the Commanders, Defense Contract Administration Services Regions, with the coordination of the contracting agencies of the government. Nominations were carefully screened prior to the selection of the ultimate recipients.

It gives me great pleasure to inform you that your facility has been selected for an Outstanding Award for 1970. I wish to commend, for his personal efforts which have resulted in an overall Industrial Security Program worthy of this recognition, Mr. Gaetano D. Rozzi, your Vice President in charge of Security.

My congratulations to you and to all of your employees for this fine achievement.

Sincerely,

Robert H. McCutcheon

ROBERT H. McCUTCHEON
Major General, USAF
Deputy Director
Contract Administration Serv

Tom - This is great! Our compliments to you and your entire staff! This is the sort of thing that helps to keep Grumman on top. Many Thanks, Lew

Buy U. S. Savings Bonds -- Payroll Savings Plan!

Top award. **Vice President Tom Rozzi (R), director of Security and Personnel Services, accepts Cogswell Award plaque and citation from Brig. Gen. Louis Schelter. The presentation marked the second time Grumman has won the award since it was established in 1966.**

Grumman Ecosystems—the world is its field . . .

Ecosystems officers. Senior Vice President Bill Zarkowsky (C) has been elected President of the new Grumman subsidiary, Grumman Ecosystems Corporation. Other officers (L to R) are Roy Montano, Controller; Larry Pierce, Secretary; (Zarkowsky); Bill Schwendler, Jr., Executive Vice President; Tom Attridge, Vice President of Operations. (Photo by Harry Prodromides)

Grumman Ecosystems, operating since 1969 as a department within Grumman Aerospace, became Grumman Ecosystems Corporation on January 1. Senior Vice President Bill Zarkowsky was elected President of the new subsidiary of Grumman Corporation, and Bill Schwendler Jr. was named Executive Vice President.

The Ecosystems Board of Directors is headed by Clint Towl and includes Lew Evans, Bill Schwendler Sr., Zarkowsky, and Bill Schwendler Jr. The officers, besides Zarkowsky and Bill Schwendler Jr., are Tom Attridge, Vice President of Operations; Ray Montano, Controller; Larry Pierce, Secretary; and Ken Guttenplan, Assistant Secretary. Bill Malloy heads Marketing and Joe Missbach is in charge of Resources.

The new subsidiary envisions an extensive plan of operations, with these goals for national and international investigation:

- Construction services
- Resource development
- Exploration and mapping
- Environmental control
- Coastal zone management

And their field is the world. Schwendler, for example, is negotiating programs with Japan and Alaska, Tom Attridge is working with the Brazilian government, and Doug Hill, who is in charge of Environmental Programs, is pursuing work closer to home in New York City. The Ecosystems staff is comprised of about 30 people and is based on the second floor of Plant 4.

Large-scale projects

"We'll expand in a modest way as new business is brought in," Zarkowsky said last week. "We did over a quarter of a million dollars' worth of business in 1970, and we've got a greater goal for '71."

To back this up, Bill Schwendler Jr. outlined some large-scale projects Ecosystems is pursuing—including one in Alaska that he regards as "imminent." This one, in the area of construction services, would be a waste and water system planned, designed, and built in a Federal Water Quality Administration Village demonstration project, with the concurrence and help of Alaskan Eskimos and Indians.

Assisting on that project is Cliff Black, an Eskimo himself, who is working in Ecosystems' Alaskan office. His training with Ecosystems will provide him with valuable experience that he will use later in assisting with native economic development.

This model community center, financed by the Federal and Alaskan governments, will have modern water and sewage systems and habitation designed specifically for that type of environment. "We've already done studies on the Alaskan ecology and environment," said Schwendler, "and now George Scheuerlein of Ecosystems and our Alaskan consultant are working with the local village officials. We've established ties with local construction companies and architects, and their plans are being formulated with the help of native Alaskans. We're competing with other companies for this government project, but we consider ourselves to be a leading contender."

Other pursuits

Ecosystems is pursuing other areas of interest, too. In resource development, for example, Marketing head Bill Malloy sees tremendous potential markets in Greenland, Australia, Canada, and Brazil. The two Ecosystems' aircraft, a turboprop Gulfstream I and an A-26C, are equipped for aerial survey work. "By combining our experience with these specially equipped planes, we look forward to doing oil and mineral exploration in some of these untapped areas."

Ecosystems, together with Grumman International and a Brazilian consultant, has just responded to the government of Brazil to explore the resources of the Amazon. The Brazilian government wants to know what the geology of the area is, what the drainage patterns are, and the potential resources, with a view to encouraging habitation and industrialization, farming, grazing, agriculture.

"All you can see flying over that great expanse is solid greenery, with little indication of true contours," says Malloy. "But aerial mapping with photographic and radar imagery can penetrate the depths of the forest and provide an accurate indication of the true potential of this little-known area."

In the more familiar environs of Manhattan, Ecosystems has proposed a pollution-control study of the New York Harbor area that would provide the City with a better understanding of the water situation in the area. In such a project, large and complex and of immediate concern to millions of local residents, Ecosystems plans on contracting with Grumman Data Systems and Grumman Aerospace Research for certain computer services and other data.

In association with a Long Island university and Grumman Aerospace Research, Ecosystems has proposed developing a mathematical model of the Great South Bay employing biological, chemical, and physical observations using aerial and waterborne data collection. Objectives of the study would be to establish the criteria and standards to maintain an acceptable water quality of the Bay.

In Maryland, Ecosystems is delineating wetlands boundaries under a contract from the State. Aerial and ground surveys were made in October, and interpretation of those results is being done in association with a local university. Prospects for follow-on work of this type in nearby states look good, says Schwendler. "Our work on Lake Canadarago in upstate New York should be beneficial in getting additional business."

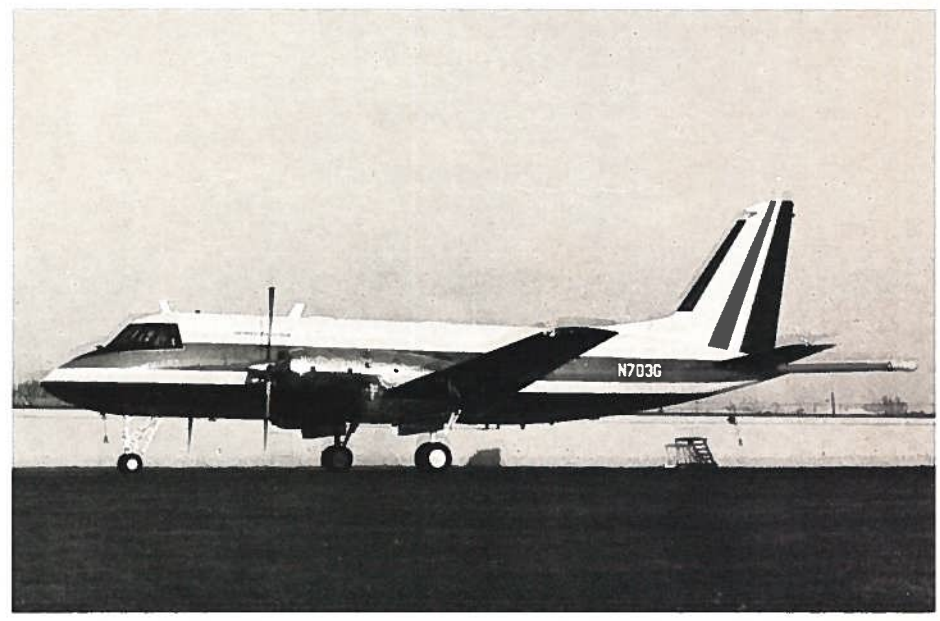
Ecological balance

Sewage and other kinds of environmental degradation — among today's major concerns all over the world— have Ecosystems personnel studying many aspects of their causes and effects, and, says Schwendler, their work is showing promise of helping to achieve a healthier ecological balance. Illustrating this, he pointed to work being completed this month in Alaska. "The Prince William Sound planning job will recommend management actions to the State to control the development of the area, which includes the southern terminus of the Trans-Alaska Pipeline.

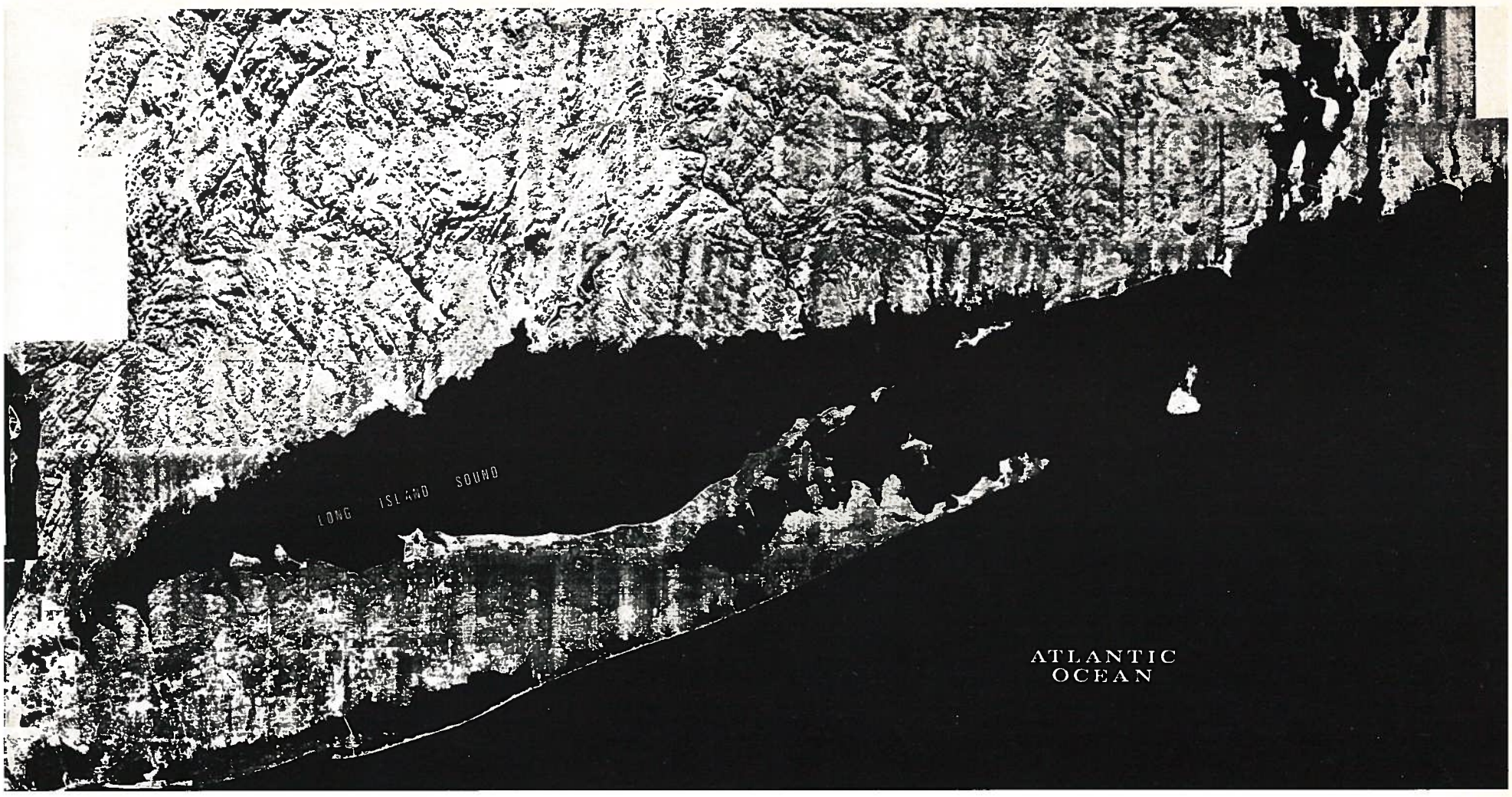
"The resource inventory of the Wood River-Tikchik Lake region in Alaska is nearing completion, and we expect that an option will be exercised by the State for Ecosystems to put together a first look at the area's recreational potential. And the Gulfstream I had a successful summer program in Canada while performing work for the government and private clients."

Powerful contributors to these numerous documented studies are the two aircraft operated by Ecosystems. A team headed by Ralph Frei completed modification on the Gulfstream I last year. The aircraft is equipped with a 16-foot magnetometer boom for searching out minerals and petroleum and for making geological surveys. The aircraft is also equipped with an infrared line scanner, provisions for simultaneous multi-spectral photographic imagery acquisition, and an analog and digital data acquisition and annotation system.

The converted A-26C has a photographic bay and a side-looking radar. Both aircraft are kept in rented floor space in Plant 4 and maintenance services are provided by Ecosystems people,



Ecosystems' Gulfstream. New Grumman subsidiary, Grumman Ecosystems Corporation, owns this turboprop Gulfstream I, newly painted blue and white. Aircraft has 16-foot magnetometer (MAD boom) for searching out minerals and petroleum, an infrared line scanner, and two special photographic bays, all useful for aerial surveying. (Photos by Harry Prodromides)



Mapping equipment. **The modern way of mapping is demonstrated by this mosaic of Connecticut and Long Island. It was made with a side-looking radar for the U.S. Geological Survey. Cover photo is a magnified section of this mosaic.**

or are bought from either Aerospace or from contractors when off-site.

"Operation of these specialized aircraft requires extensive training," Tom Attridge said, "and the flight crews under Walter Berndt have shown increasing proficiency throughout the year. Our production operation under Bob Pate has also shown steady improvement—and so with our first year of training and operations nearly behind us, we are anticipating a new year with expanding markets, new challenges, and broader responsibilities."

New role

Bill Zarkowsky assumes his new role as President of Ecosystems without relinquishing his other hats. He is Senior Vice President of Grumman Aerospace and a member of its Board of Directors and he is chairman of the Executive Operations Board for Grumman Aerospace.

His association with Grumman began in 1937 while he was an engineering student at New York University, and he was the first in the Company to become a Sloan Fellow at M.I.T., where he received a Master's degree in Industrial Management in 1958. He has been E-2A Program manager and director, and is director of all Aircraft Programs in Grumman Aerospace in addition to many other executive responsibilities. The Zarkowskys have four sons and a daughter and live in Huntington.

Helped form subsidiary

Ecosystems Executive Vice President Bill Schwendler Jr. has been working closely with Zarkowsky and with Tom Attridge ever since the Ecosystems Department was contemplated. His association with the Company goes back to a long series of summer jobs spent in various departments: Static Test in 1959; Equipment & Process Engineering, 1960; Facilities Planning the next two summers; E-2 Program in '63; Business Development Planning in '64.

The next summer he worked at First National City Bank, and in August of '66 he joined Grumman in Contracts, New Business area, where he stayed until January of 1969. He worked in Legal and then became manager of Corporate Development. Since the Ecosystems Department was formed a year ago, he has been working long hours with his associates to build it into a profitable business. Bill is a graduate of Princeton and Harvard Business School (MBA, 1966). He's engaged to a girl he met in Alaska and is planning to be married next month.

"The fellows in Ecosystems all think we'll go home on time for a change now that I'm to be married," says Bill. "I hope they're right!"

Former test pilot

Deeply involved in the development of Ecosystems is Tom Attridge, Vice President of Operations. A World War II Hellcat pilot, former test pilot for Grumman, and the LM-3 vehicle director, his career since he joined Grumman in 1949 has been closely linked with new developments in the Company. After he had worked in the shop as an apprentice engineer, he joined the Rigel Missile Program. For a number of years he was test pilot, co-manager, then manager of the E-2A Program. In 1967 he became the vehicle director on LM-3 —a post created to control the changes on the moon vehicle.

Attridge stayed with the LM Program through Apollo 12 and then, in October of '69, was invited by Zarkowsky to collaborate with Bill Schwendler on the Ecosystems project. Attridge is a Bowdoin College graduate with a year of post graduate work at Cornell. He and his wife live in Glen Cove and have three grown daughters.

Law specialist

A comparative newcomer, happy to be free of the commuting crunch, Larry Pierce, Grumman Corporation Assistant Secretary and corporate law specialist, will be Secretary of Grumman Ecosystems. For 14 years, until he joined Grumman Corporation last February, he was with Foremost-McKesson, Inc., in Manhattan. He's a graduate of Fordham College and of Fordham Law School. In World War II for more than three years he was on the cruiser USS Detroit and in Tokyo Bay on the day of the signing. In the time he saves by not commuting to New York from Syosset he coaches basketball at St. Edward's Church "and we're doing very well, 9 and 1" (as of last week). He and his wife have four children, "two of each."

Started as auditor

Ray Montano, Controller of the new subsidiary and a certified public accountant, came to Grumman six years ago as an auditor in Corporate Audit & Procedures, where he worked in the Systems area for four years. He went

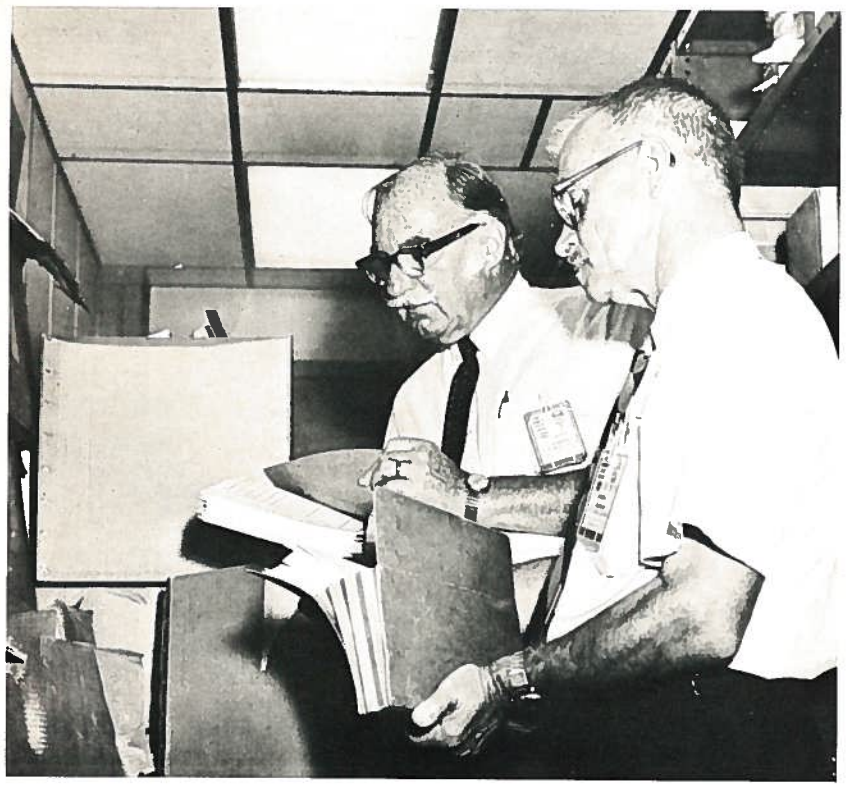
(Continued on page 8)

3-D. **Two successive aerial views of Calgary, Alberta, create 3-D effect when viewed simultaneously. Like your grandparents' old stereoptican. Original pairs of aerial photos are in color.**

"We are a young, vibrant company, filled with talent and enthusiasm. The prospects are endless. We believe in it—that's the important thing—and we look forward to making our contribution to a better world environment and stimulating the use of earth's resources for the betterment of mankind."

Bill Zarkowsky

Space savers



Grumman's "STOP" (Stop Tons of Paper)) Program got a boost from personnel at Kennedy Space Center. Thus far, they have eliminated 368 obsolete or unwanted forms and removed from the reproduction cycle 24,182 pages or other documentation per year. This saves paper, handling, and storage costs of $15,200 in forms alone. (That's Bus Watson and Ted Hammen examining the contents of a discarded package.)

Pick-up boxes were placed at seven strategic locations, distribution lists were reviewed and reduced, file cabinets were emptied of unnecessary paper, and an intensive study was made of all the forms in use at KSC. So successful has been the paperwork reduction at KSC that Bruce Tuttle, head of the STOP team, urges the KSC example be followed by all other Grumman field sites.

New Hawkeye nears first flight

When Senior Vice President Bill Zarkowsky (shown above L), Vice President Corky Meyer, and E-2C director Tom Guarino visited with members of the E-2C team at Plant 4 recently, they spent a good deal of the time stressing the importance of the program to future corporate health.

The "C" version of the Hawkeye, scheduled to fly for the first time this month, is going to give the Navy a bird with much keener sight for airborne early-warning missions. The E-2C will carry advanced AEW systems: new radar, updated computer, new navigation system, and new displays. This new avionics "suit" will assure increased reliability and maintainability, and greater radar detection, too.

An "old" E-2A is being refitted to the "C" configuration. There will be some minor structural changes—a larger air scoop for equipment cooling, for example—and when all is completed, they'll roll her out for first flight. That's expected in January—about a month ahead of schedule.

OBITUARIES

Plane News has received word that death has come to the Grumman personnel listed below. We extend sincere sympathy to relatives and friends.

THOMAS F. HARVEY of Receiving & Stores Management & Staff, Plant 30, died December 18. He was 58 years old and had been with Grumman nearly 30 years. His home was at 87 Island Pl., Amityville.

HARRIET R. BACHMAN of Food Service, Plant 35, died December 19. She was 61 years old and had been with the Company five years. She lived at 36 Oak Tree La., Levittown.

ARTHUR COLMER died December 22 at the age of 55. He had worked in Machined Parts/Raw Material, Plant 30 and had been with Grumman seven years. His home was at 299 Bay 8th St., Brooklyn.

THOMAS F. CONNOR of Fiberglass, Plant 27, died December 23 at the age of 54. He had been with Grumman 18 years and he lived at 127 Budenos Dr., Sayville.

STANLEY H. KOWALL died December 23 at the age of 62. He had been with the Company since 1965 and he worked in Surfaces & Assembly, Plant 5. He lived at 17 Walnut La., Hicksville.

HENRY J. RUFF of Tool Fabrication Sub-Assembly - Tools, Plant 2, died December 25 at the age of 52. He had been with Grumman 11 years. He lived at 676 Whittier St., Westbury.

WALLACE SLIVONIK of Instrument Test, Plant 33, died December 27. He was 52 years old and he had been with the Company 22 years. His home was at 29 Willis Ave., Syosset.

ROBERT C. BECKER, age 25, died December 30. He worked in Invoice Audit, Plant 30, and had been with the Company since 1965. His home was at 5 Camp Dr., Selden.

GUNTHER PFEIFFER died January 1 at the age of 44. He had been with the Company nine years and his department was Fuselage Sub-Assembly, Plant 27. He lived at 2 John St., Bay Shore.

United Fund drawing

In case you've been wondering, there **will** be a drawing for United Fund prizes. Yes sir, and come next Thursday, January 21, there will be 24 prizes —headed by a combination color TV-stereo—up for grabs. It starts at 10 a.m. in the Plant 3 cafeteria. If you're in the vicinity, stop in; you may hear your name called.

List snow-closing information

In the event of severe snowstorms or other emergencies this winter, information concerning plant closings will be available by dialing either of two Grumman Aerospace telephone numbers or through spot announcements on local radio stations.

Personnel may call either LR 5-5111 in Bethpage or PA 7-1504 in Calverton, beginning at 5:00 a.m.

The radio stations carrying plant closing information will be:

WNBC	**660**	**WTHE**	**1520**
WHN	**1050**	**WGBB**	**1240**
WBAB	**1440**	**WMCA**	**570**
WOR	**710**	**WABC**	**770**

Other Long Island stations have fluctuating broadcast schedules and are therefore not listed.

To facilitate snow removal in parking areas, the Grumman Facilities Maintenance Department urges that automobiles parked beyond normal daytime working hours be left unlocked so that they can be moved if necessary. Valuables should be removed or locked in trunks.

Ecosystems—the world is its field . . .

(Continued from page 7)

into Systems Analysis and in 1968 moved to S/CAT Operations Systems, then to S/CAT Systems & Documentation Control. Montano returned to Corporate Audit & Procedures to work on Special Projects and in 1970 was named chief accountant of the Ecosystems Department. Before coming to Grumman he was with the Laboratory Furniture Company of Mineola as assistant to the treasurer, and before that, with a CPA firm in New York.

He's a graduate of St. John's University with a degree in accounting, and he's a real sports buff. With his wife and three children (the twins are eight), he lives in Merrick and keeps the TV warm during baseball and football weekends. In the active department, he bowls and plays golf and softball.

Traveling to Europe?

If you want to sign up for the GAA-sponsored jet flight to Europe in May, GAA has scheduled registration at 5:30 p.m., January 20, at Plant 28.

Holiday fund-raising benefits vets, many kids, and families

The Navy office and Grumman Aerospace conspired together, with some subtle persuasion from Navy's Jo Grimaldi and Elaine Montaperto, to brighten the Christmas season for hospitalized veterans at St. Albans Hospital in Queens. The more than 1,000 gifts included 65 portable radios, three portable TVs, and seven cameras, with Grumman Aerospace adding 30 baskets of fruit, and the Grumman Ex-Servicemen under Pete Volpe contributing.

Jo and Elaine pressed Joanne Butler and Teri Woods of the F-14 Program in Plant 15 into service, and Guard Bill May of Plant 25 lent muscle and good will. Two artists from Presentations—Fred Haul and Jim Rodriguez—had a great time sketching patients. In a couple of cases their subjects were sleeping, and the sketches were left for their amusement when they should awake.

More than $5,000 poured into the Engineering Christmas Fund from engineers in the Bethpage plants, and most of this went out to families where hardship was known to exist at the holiday season. There will be some left for a favorite charity, the Salvation Army's summer camping program. Ardith Tepedino and Dolores Voss of Plant 5 Executive spearheaded the collection.

Leo Senior reported that the Product Support Department distributed $2,600 to ease the plight of families down on their luck. There was a balance this year, and it has been deposited in the Credit Union. Senior said: "It will give us a good start for next year."

From the heart. Elaine Montaperto (L, upper photo) and Jo Grimaldi (R) of Navy Office with Teri Woods (2nd L) and Joanne Butler of F-14 Program took 1,000 gifts from Navy and Grumman donors to St. Albans Hospital patients December 15. Jim Rodriguez (R, lower photo) and Fred Haul of Presentations brought smiles by doing quick portraits of the Vietnam vets. (Photos by Fred Annette)

KSC team prepping Apollo 14 for second flight to Fra Mauro

(Continued from page 2)

of the Apollo crewmen.

But the key to the upcoming mission, and the three scheduled to follow, is the astronauts. There has long been a conviction in NASA and Grumman that only humans can do the lunar exploration job satisfactorily. Only they possess judgment—what to look for, what to try to recover on the lunar surface, and how long to spend at a given task. Remote-controlled equipment lacks that capacity to discriminate. This is a particularly important consideration now that manned missions (at the time, at least) are to be limited to four. As Dr. Tripp has observed:

"As we wouldn't expect that five or six very brief probes of the earth would 'describe' the earth, the same holds true for the moon. But since we are limited, we've got to strive for the most we can get on each of these four missions."

There is, then, the urgency of significance.

"There's a lot riding on each mission," says Tom Carpenter, Grumman's spacecraft director on LM-8. "The 700 people here at the Cape know that, and the way they've dug into making this LM the best LM of all is really great. If a 'perfect' vehicle is possible, I have to believe this is it."

Yates heading F-14 board

(Continued from page 3)

A preliminary post-crash evaluation by Grumman officials indicated, in part:

- The No. 2 F-14, scheduled for completion soon, is instrumented to obtain low-speed technical data needed to meet program requirements. The loss of No. 1 should not unduly delay the program, although some changes in instrumentation may be required to obtain the data that should have come from No. 1.
- The general handling characteristics were checked to confirm that the design substantially meets its over-all qualitative requirements.
- The failure that induced the difficulty was not in the primary structure or propulsion system.
- Since the F-14 is ahead of schedule, it's expected that any program delays will be minimal.

Although the initial shock of the crash was predictably unnerving, the blow was cushioned by the knowledge that Smyth and Miller were safe, and in good condition. In addition, there was no follow-on gloom-and-doom feeling. It was quite the contrary, in fact: No one doubted the worth of the F-14 or the Company's ability to make it the best Navy air superiority fighter in the world. As President Lew Evans said:

"We've got a great airplane here, and although we've had a setback today, as far as I'm concerned, nothing will slow the program."

plane GRUMMAN news

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Betterino soars to record 723, Sorro's 288 sets mark

John Betterino's on another tear—and if the stocky pin-spiller isn't careful, he's going to have so much hardware at year's end, he'll have no place to display it. Just recently, John pushed to the highest series in any of the Grumman leagues this season with a sparkling 723 in the Syosset Mixed loop. That total was aided by a record 253, 246, and 224. He had a 234, and 219 for a 650 a week earlier in the same league.

In Black league play he soared to 683 on 230, 231, and 222—but that one fell short of the league record of 695. Oh yeah—he owns that one too!

Joe Sorro shared the spotlight with Betterino as he soared to a 288, highest of the season in the Rocket circuit. Joe, who spared in the first frame, then ran off 10 straight strikes before finishing with an eight count for his new 288 record. He finished with 604.

Among the highlights in Syosset Mixed play were Eric Bunzel's 214-214-615 and Rita Mathia's 224-557. . . . Black stars included Betterino (again), 215-255-661; Steve Lawrow, 205-205-610 and 216-234-639; Carmine Vitale, 255-606; George Rasmussen, 236-605; Frank Weber, 206-214-605; and Art Grey, 220-236-603. In that competition, John saw one of his marks slip away as Bob Specht pushed to a 608 with a record-breaking 268 game.

Locke on target

Judge Locke holds high average (187) in the Bethpage Nite Owl circuit but he's having trouble latching on to any records. In a recent session, Judge tacked up 236, 205, 214 for 655—both well short of Ralph Laurino's 266-706 records. Other bright spots were Al Moszkow's 204, 204, 208 and 616 and Marty Suza's 244. At the close of his final 1970 report, Rudy Dunkley sent his wishes: "Merry Christmas, Salamu, Happy Chanuka, Happy New Year." That says it all, Rudy!

Bill Gallagher said goodbye to the old year with 224-613 in the Outpost loop, while others closing out 1970 with high scores were: Ralph Nelson, 219-207-600; John Alston, 206-591; Roy Moser, 200-582; and Tom Conley, 214-575. . . . Charlie Stack paced the Lunar league with 224-613. . . . Rob Olgivie's 205-205-576 edged Stan Miller's 214-569 in Classic play, and Tom O'Connor's 222-228-619 outdistanced Ed Lomot's 214-580 for honors in Aerospace bowling.

Bob Dudonis punched out 228-206-625 and followed it up the next week with 205-268-672, but the Mustangs could pull themselves up no higher than seventh in the Classified league. Dudonis, who holds the series mark of 719, raised his own game mark by 14 pins with the 268. Other high scores included Bob Ruotolo's 216-601, Mike Mustapich's 221-597, Joe Sardi's 217-593, and Jim Donovan's 202-203-597. . . . Highlights in the Patchogue Mixed league included Joan Burgess's 501, Marty Larcombe's 202-535, Maggie Gaynor's 527, and Gene Burgess's 231-560.

Climbs to 617

Lefty Ed Gabriel climbed to 617 on 227 and 221 games in the Babylon Mixed circuit, but Stu Kornreich rattled off a pair of 202s to sign in with 531 in a recent session. So what, you say? So Stu has only a 123 average, and that ain't bad bowling. Also, Charlie McClee tapped out 233-586 and Janet Thomas totaled 507.

In the Woodbury Mixed loop, Donna Lawrow embarrassed the big guys by capturing high series honors with 593 on a 200 base. George Daly hit for 223-518. Earlier, Donna hit 222-531, while Daly collected 213-536. . . . John Betterino finished at 813 for four games in the Masters league, while Ray Zeller had high game of 245. . . . Among other high scores were: in the Red loop—Ted Martines, 235-211-628, John Kielbasa, 200-591; in the Brown league—Al Cilento, 219; Ray Xeller, 579; Al Jowid, 237; and Ray Xeller, 617.

Downhill racers

It was close, but the Grumman Ski Team came out on top last Sunday in one of the hottest matches in the N.Y. Amateur Ski Team League's history. After the giant slalom held at Pico Peak, Vermont, on Saturday, January 9, four of the six teams in competition were still in a squeeze for the title.

Going into Sunday's competition, Grumman's chances looked slim—the racers had picked up only two medals of a possible nine on opening day. The team picked up four more medals Sunday—that made a total of six of a possible 18—and squeezed out a victory over Edelwise.

Although team captain Bob Schmitt stressed it was a "team victory," he singled out Carol Sweeney, Riho Melts, Bob Baciuska, and Alexis Cenko for special praise.

Singles to open paddle play; Bethpage tourney starts Feb. 1

Play is scheduled to get underway Monday, February 1, in the 27th annual table tennis tourney at Grumman, with competition set for plants at Bethpage, Calverton, Wyandanch, Syosset, and Garden City.

Entry deadline for both singles and doubles has been set for Friday, January 22, by tournament director Herb Mahoney of the Grumman Athletic Association. An entry registration form contained on this page should be submitted to GAA at Plant 28B, Bethpage.

Winners and runners-up from plants in the Bethpage area will advance to the all-Bethpage finals. Plant champions will compete for Class A titles in the inter-plant event, while runners-up will join in the B division playoffs.

Singles play will precede doubles competition this year—a change in procedure from previous years — and a double-elimination system will be used for the tournament. (An individual or team must lose two matches before being eliminated from the tourney.) Matches will consist of two-out-of-three games in plant preliminaries, and three-out-of-five games in the finals of inter-plant competition.

For further information, call Herb Mahoney at Ext. 2133 or 2269.

Table Tennis Tourney

Entry Blank

Singles

Name .....

Plant ..... Dept. ..... Perm. No. .....

Days ..... Nights ..... Phone Ext. .....

Doubles

Partner's Name .....

Plant ..... Dept. ..... Perm. No. .....

Days ..... Nights ..... Phone Ext. .....

Entry Deadline Friday, January 22

(Forward to GAA Office, Plant 28B)

Hustlers, unimpressed by press clippings, bounce Research from unbeaten, 100-65

Is there a doctor in the house? Hopefully, there is, because Research, former co-leaders of the Tuesday-Thursday basketball league will have to do some research to find out why the Hustlers beat them, and badly, 100-65, last week. The Hustlers claim that Research's sights were on their press clippings, not on the basket. Could be.

Fine shooting and a stingy defense by the Hustlers paid off—and by the end of the third quarter, Research was way behind, 85-47. Bob Hambrecht led the scoring for the Hustlers with 22 points, while Walt Gleich contributed 16 and Art Lih, 15. John Brook was high for Research with 17.

But then, all good things have to end. Research, after finding themselves the doormats of the hoop league for so long ——the team was on a 25-game losing streak at one time—were off on a modest win streak this season. When they came a cropper against the Hustlers, they had reached four.

Earlier, John Brook poured in 26 points and Mike Shilman contributed 22 in addition to some strong board work as Research knocked off Propulsion, 84-77, for its fourth straight win. Propulsion closed the gap late in the tilt with help from Harold Glasband's 26 points, but Research scored just enough to stay in front.

In other hoop contests, the Newcomers overran the Druids, 136-61, with four of the winners scoring over 20. Ray Schaefer hit for 28, Frank Quarto, 27, Lee Gendron, 22, and Ed Krol, 21. It was the fourth straight for the Newcomers, too. Earlier, Quarto netted 26 points in the Newcomers' 98-71 victory over the Supporters. Other high scorers were Gendron, 15, Jim Cruthers, 14, and Ed Krol, 14.

The Supporters won their first of the season, 77-62, against the Druids. Nunz Sterrantino led the scoring with 18 points, while team mate Alex Kirillin contributed 14.

A couple of ringers

There ain't no justice! Rick Firth and Henry Nelson ran away with the Plant 24 quoits league, scoring 78 points, with the team of Joe Horne and Tom Hennion a distant second.

But the playoffs were something else again. Bill Mason and JoAnne (yes, JoAnne) Loeffler, who came in fourth, knocked off the champs in three straight, 21-19, 21-17, 21-18, to qualify for the finals. Horne and Hennion, meanwhile, were eliminating third-place Jeff Quarles and Casey Stengel, 21-7, 19-21, 21-1, 21-11.

In the finals against Bill and JoAnne, Hennion and Horne came through again, but barely, 21-18, 19-21, 21-16, 18-21, 21-18, 21-20.

Ride Wanted

LYNBROOK: Peninsula Blvd. & Merrick Rd. to Plt. 25, morn. only. 887-9189.

BAYPORT: To Plt. 2, 7:30-4 p.m. 472-0823.

HOLTSVILLE: 1 blk. from L.I.E. 289-5606.

WESTBURY: Vic. of Brush Hollow Rd. & Jericho Turnpike to Plt. 34 complex. 334-0735.

Car Pool

WHITESTONE: & Throgs Neck Bridges to Plt. 35, 8-4:30. 212 423-4097.

Wanted

MANUAL: '64 Dodge Dart. 289-1661.

USED CAR: 4-dr. sed./hdtp., auto., $350-450. 822-3107, 10-4 p.m.

APT.: W. Babylon, 4½ rms., gar., yd., nr. everything, couple only, security, $170/mo. plus util. 587-9486.

APT.: Huntington Sta., 5 rms., bus. couple pref., avail. Jan. 15, $225/mo. HA 7-0245.

ENG.: 6 cyl., good cond., for '65 Chevy. 724-9647.

ENG.: 389 c.i. or 400 c.i., for '66 GTO. Ed De Pinter, Ext. 7591.

HOUSE: Patchogue area, no money down, will pick up mtge. paymnts. & closing fees. GR 5-6129.

MISC.: Hodaka motorcycle eng., 90 or 100cc.; metal lathe, 6 or 8 in. swing. PY 8-4258.

CANOE: Used w/access. 298-9424.

MISC.: Freezer & TV antenna log periodic pref.). 724-3057.

CAMERAS: 35mm Canon VT, & VI-T, Contax IIIA, Kodak Ektra, Bell & Howell Foton, Nikon SP, Leica III C. 543-6987.

ROOM: Nr. Plainview or Bethpage, pvt. bath, for gent. HA 7-8453.

ENG.: Mod. airplane, ignition type, new or used for antique eng. collect. MA 6-2825.

TEXT BK.: Principles of Numerical Controls, 2nd edit., by James Childs. FR 8-2537.

For Rent

APT.: Melville, 2½ rm., furn., Danish mod., $155/mo., all util. incl. 271-2588.

HOUSE: Center Moriches, 3 bdrm. Dutch col. nr. Moriches Bay, 1 yr. lease, $225/mo., avail. March '71. 878-0962.

ROOM: 15 mi. Bethpage, laund. & kit. priv., gent. pref., $85/mo. 671-4083, after 6.

ROOM: N. Bethpage, pvt. home, linens & shower, gar. opt., $17/wk. WE 5-2055, bet. 8-10 p.m.

APT.: Bay Shore, 2 bdrm. w/stor. area, recent. decor., nr. bch., under $200/mo., gar. park. avail. 665-7771.

ROOM: Bethpage, furn., pvt. home, attach. bath, linens, gent. pref., Plt. 2 area. WE 5-3588.

ROOMS: Nr. Grumman, pvt. ent., bath. PY 6-4210.

APT.: Hauppauge, garden, sublet, 3½ rm. & terrace, air cond., avail. March, $180/mo. 234-8240.

APT.: Uniondale, E. side of Hofstra, 3 rm., $185/mo. incl. util., no pets. IV 6-7605, after 5.

ROOM: Lrg. furn., Freeport area, 20 min. Grumman. FR 9-3155, after 6.

APT.: Lindenhurst, 2½ rm. furn., pvt. ent., util., $125. TU 4-4847.

ROOM: Man to share furn. apt. in Westbury w/ N.J. commuters, sun deck. TV, kit., closet space, nr. Grumman, $20/wk. 334-1294.

Free

REFRIG.: Servel gas, approx., 9 cu. ft. AT 6-1197, after 5.

Adoption

KITTENS: 3 blk. w/wh. mark. 732-7265.

ST. BERNARD: Mix, collie sz. & color, gentle disp., 6 mos., fem., will have spayed. IV 1-9356.

PUPPIES: Mix. breed, small to midi, no chg. 796-0617.

GERBILS: Male & fem. pets for child. WE 5-3066.

For Sale

MOBILE HOME: 10x55, gun furnace, full air cond., w-w, s-s, must be moved, $3,500 firm. MY 1-5123.

HOUSE: Setauket, 3 bdrm, ranch, tp. sch. dist., options, $29,900. 751-5791.

For Sale

HOUSE: Selden hi-ranch, 9 rm., 5 bdrm., 2 bath, sundeck & gar., new w-w, wood lot lndscpd., $25,500. 732-0828.

FURN.: Trad. love seat, cocoa uphol., $35. PE 5-4445.

PIANO: Upright, Kranich & Bach, ask. $100. AN 1-5936.

MOBILE HOME: '69 Price Meyers, 52x12, comp. furn., col. set., gas heat & stove, elec. refrig. & hot water heat., curt. incl., 2 bdrm., bath, liv. rm. & kit., $4,500. HR 2-1706.

DODGE: '65 Dart w/'67 eng., 6 cyl., 2-dr., ask. $490. FL 2-3065.

CORVETTE: '66 conv., 300 hp, 327 c.i., 3-spd., R&H, 42,000 mi., best offer. 883-6898.

MISC.: '66 Austin Healey, some new equip., $1,950; '24 Mod. T tour. car, operat., recent o'haul. eng., no rust, $1,600. HA 7-0245.

PARTS: MGB, comp. 5 main eng., o'drive trans., wire whls. rear end, all $300; fact. hdtp. w/hardware, $200, $450 takes all. 212 762-7882, after 8.

TIRES: Kelly snows w/tungsten steel tips, sz. 6:75x15, 4,200 mi. mtd. on rims that fit '59 Rambler, $20. MY 4-5814.

HOUSE: Greenlawn, 7 rm. true centerhall ranch, panel. den. w/firepl., dbl. gar., full bsmt., 3 bdrm., 2 bath, eat-in-kit., formal din. rm. w/bay wind., landscpd, xtras, $44,990. 757-8496.

For Sale

REFRIG.: Freezer, 11 cu. ft. Hotpoint, $20. 234-8310.

TIRES: 2 snows w/whls., 7.75x14 tubeless, 4-ply nylon Carnegie prem., used 1 sea., $25/pr. 212 479-1456.

TIRES: 2 snows & whls., 600x15 for '69 Volvo, used 1 sea. 212 BO 3-9182.

STEREO: Eight trk. tape mach. for car, $20. Eileen Diamond, Ext. 2210.

DRYER: Gas, Whirlpool, $25. 334-8457.

JAGUAR: '69 XKE 2-plus-2, 19,000 mi., air cond., wire whls., 4-spd., bumper guards, AM/FM, $4,000. TU 4-4988.

PLYMOUTH: '63 Belvedere, 2-dr. sed., auto., R&H, trlr. hitch, snows, new bks., wh. w/red int., $375. 928-1711.

CAB. CRUISER: 22 ft. Trojan, upper part of cab. (only) part. burned, galley w/icebox, sink w/fresh water, stove, 2 bunks, hd. w/approved elec. toilet, 100 hp Gray Marine inbd., handyman spec., best offer. SU 1-2992.

LAND: Conway, N.H., 2/3 acre in Chalet Vill. w/mt. tp. pool, 3 lakes, tennis cts., piped water, elec. avail., 5 major ski areas nr., $3,900. 586-3511.

MISC.: Wal. formica din. rm. set, 72 x 30 tbl., 6 chrs., 54 in. hutch, $250; Singer sew. mach. cons., $30; Shetland fl. waxer, $15; 1-14 lb., 1-16 lb. bowl. balls w/bags, $10/ea. JU 1-3584.

For Sale

FORD: '63 Galaxie, auto., R&H, 48,000 orig. mi., AM/FM, V-8, ask. $375. 822-1005.

WIG: 100% human hair, new short honey brown, $55. 586-2446.

FORD: '65, 4-dr., auto, $325. 543-3732.

VW: '63 bus, bdy. fair, reblt. eng. w/5,000 mi., $600. WE 5-3999.

OLDSMOBILE: '69, 442, auto., AM/FM stereo, air cond., poly tires, 2 poly snows, chrome whls., vinyl tp., alarm. 785-0244.

ENG.: '64 VW, 40 hp, reblt. & install., $150. 273-6239.

MISC.: '64 Rambler 220, 2-dr. sed. w/65 eng., new bks., trans. seals, tires, 2 new snows, tune-up, $350; 7.75x14 Vanderbilt tracking snows w/F-85 Old rims, used 2 seasons, $20. 868-1819.

HANDLEBARS: For motorcycle, new, 29 in. x 7 in. rise w/cross bar, $10. PY 8-4258.

MISC.: 4, 650x13 tires, 2 mtd. on Corvair whls., $25; 2 Corvair whls. 271-4486.

TIRE: New E70-14, w/w, Goodyear spdway wide tread, $12. 234-6378.

TIRES: 2 snows, 6.50-7.00x13 for Mustang, best offer. 212 FL 3-4593.

VW: '67 Karman Ghia conv., red, blk. tp., radio, $900. 288-2534.

STEREO AMP.: 30w, Lafayette mod. LA-224T, ask. $35. PE 1-0885.

CHRYSLER: '68, 300, 2-dr. sed., orig. owner, 30,000 mi., full pwr. & air cond., $2,150. 273-5369.

THUNDERBIRD: '62, blk., blk. vinyl tp., red int., 2-dr., bkt. seats, air cond., radio, pwr. steer., bks., elec. wind., 57,000 mi., new tires, muff., start. & batt., $550. PI 6-7108.

FIREBIRD: '67, 400 c.i., 4-spd., man. trans., R&H, chrome whls., $1,700. 354-4357, after 7.

PONTIAC: '62 Le Mans conv., auto., snows, wh. w/red int., bkt. seats, 62,000 mi., $100. 735-6628, after 6.

OLDSMOBILE: '68 Cutlass SS, 2-dr. hdtp., V-8, low mi., 3-spd. stick, $1,400. 368-1742.

VW: '68 Bug, $1,100. 289-4863.

PONTIAC: '66 Tempest cust., 4-dr., auto., pwr. steer., w/w, R&H, wh. w/red int., $750. 285-9686.

BUICK: '68 Spec. deluxe, 4-dr. sed., V-8, new tires, bks., ask. $1,600. LT 9-0675.

BUICK: '65 Le Sabre, 4-dr. hdtp., auto., full pwr., posi, $725. AN 5-0607.

CHEVROLET: '65, 6 cyl., auto., 4-dr. sed., R&H, 50,000 mi., snows, $595. 796-9406.

CAMPER: '70 VW, pop-up tp., radio, sink, etc., 15,000 mi., orig. warr. AN 5-6277.

PICKUP: '65, ½ ton cust., 4-spd., V-6, low mi., $750. LT 9-0050.

TIRES: 2 snows, 775-15xST (F78-15) blk. wall, used 1 winter, Allstate, $25. TU 8-5139.

WHEELS: 2 for 15 in. Ford tires w/valves, $12. C. Layman, Ext. 1438.

TIRE: W/w tubeless, Atlas F78-14 (replaces 7.75x14) 4 ply, Vicron poly, cord, $10. 212 428-2474.

TIRES: 4 used U.S. Royal Tiger Paw, E70-14. 234-3203.

FORD: '67, 2-dr. sed., stick shift, 6 cyl. 842-2313, after 5:30.

RENAULT: '59 w/'65 eng., $75. 732-3553.

CORVETTES: '61 conv., blue w/wh. insert, blk. soft tp., 283 c.i., 230 hp, 4-spd., R&H, 4:11-1 rear, orig. owner, $1,000; '65 blue conv., 2 tps., 396 c.i., 425 hp, 4-spd., AM/FM, steel radial tires, disc bks., $2,300. 742-1695, after 6.

SCOOTER: '63 Harley Davidson, 160cc, set-up for st., windshld., buddy seat, 2 lug. racks, red fbgl. bdy., 237 lbs., $175. JU 5-8597, after 5.

TIRES: 2, 6.50-13.0 snows mtd. on rims, studs, $35; 1, 6.50-13.0 Atlas Plycron mtd. on rim, $15. HA 1-0764.

ELEC. RANGE: 4 brnr., $50; Roto-Broil 400, $100. MY 4-6022.

DRYER: Westinghouse elec., 220v, wh., $50. MY 2-5928.

MISC.: Hi-Fi Fisher 500T, 90w solid state FM stereo recvr., $175; University 3 way spkr. sys., $100/pr.; Corcertone tape record. mod. 801 w/auto. reverse, $100. All for $350. LT 9-6203.

HOUSE: Strathmore E., 4 bdrm., 2½ bath, Gladstone col., wood. 1/3 acre, fully carpet., lrg. liv. rm., formal din. rm., eat-in-kit., fam. rm., 2 car gar., patio & fenc., dishwash., 6% mtge., $33,990. 473-2680.

HOUSE: Flanders, Silverbrook Colony, 4 bdrm. ranch, 50x170 w/add. 50x200 bldg. plot, 2 blks. to Peconic Bay for pvt. bch. & boat., bsmt. w/ new oil burner. LT 9-6203.

at your SERVICE

This is a free service to Grumman personnel for non-commercial advertisements, accepted on a first-come, first-served basis. Classified advertisements are carried in PLANE NEWS only on the basis that everyone replying to such advertising will receive fair and equal consideration regardless of their race, creed, color, or national origin.

Type or print ad on form available at Employee Services and Engineering counters, and send via interplant mail to PLANE NEWS, Plant 5, Bethpage. List home phone (with area code if outside Nassau or Suffolk). Limit: one ad per person per issue. No item under $10, no firearms or ammunition.

RIMS: 2, 15 in. rims from Rambler w/2 used tires mtd., 6.50x15. 543-0284.

MISC.: 177 hp Chrysler marine eng., 1½ to 1 hydraulic, $450; 18 hp Johnson outbd., $160. 878-2588.

TIRES: 4, 650x13 reg., mtd. on Corvair whls., $25. 271-4486.

HOUSE: N. Deer Park, 10 rm. hi-ranch, 5 bdrm., mother/daughter, in-ground pool, 2 car gar., 2 zone heat., xtras, ask. $35,000. MO 7-1426.

SKI RACK: Barricrafter, $10. 626-0835, 5-7 p.m.

MISC.: Girl's ice skates, wh. sz. 1½, used; all weather vinyl boots, brown, sz. 1½ will sell or trade for same in sz. 3, comparable cond. IV 5-1315.

MISC.: 4 pc. sect. w/plastic slipcov., 1 occas. chr., 1 corner tbl. & 1 coffee tbl., both wal., 1 marble tp. kit. or din. tbl. w/4 chrs., 1, 2-dr. Admiral refrig-freezer, $400. 842-0678.

WASH. MACH.: Hoover port., 1 yr., formica tp., $80. 212 445-2849.

SAILBOAT: 14 ft. Calif. Cat, util. rigged, new dac. mainsail & jib w/trlr., $250. 878-0962.

GUITAR: 12 string Yamaha, prof. mod., $150. RO 6-7632.

POODLE: Mini, fem., pick of litter, AKC, 7 wks., $85. 724-7923.

VW: '67 Karmann Ghia, orig. owner, xtras, $1,195. 212 793-1904.

BUICK: '56, auto., pwr. steer, $35. 543-6637.

BUICK: '69 Skylark, cust., full pwr., blue-wh. 2-dr. sed., vinyl tp. WE 5-7784.

VW: '67 Bug, snows, $1,100. 593-6914, evgs.

VW: '66 Bug, 52,000 mi., coral grn., radio, mtd. snows, $875. AN 5-1289.

TORONADO: '67 gold, blk. vinyl tp., all pwr., $1,800. MO 9-6706, after 5.

PONTIAC: '67 GTO, 4-spd., 350 hp, red, vinyl tp., new tires, shocks & clutch, $1,375. 728-0659, evgs.

TRAVEL TRLR.: '69, 21 ft. Frolic, fully equip., self-contained, $2,800. MY 4-1978.

MINI-BIKE: '70 Stellar Quasi, 3½ hp, Westhampton Scrambles winner, $170. PY 8-4258.

TRANSCEIVER: Lafayette Comstat 25A w/ant. & 2 Turner mikes, $99. 433-1374.

TAPE DECK: Ampex 75, little use, $125. 543-0538, after 5.

ORGAN: Baldwin Orgasonic spinet, wal. contemp., percussion ensem., self-contained ampl., $350. 643-8493.

MISC.: 19 in. Zenith TV; 21 in. RCA TV, gd. work. cond.; 3, 14 in. Chevy rims. OV 1-7381.

TIRE: DNE snow w/rim, 900x15, $15. Tom Vaughan, Ext. 57-407.

MISC.: Keystone auto. slide proj., remote cont. timer w/Projek tbl. & lrg. slide case w/12 cases for slides, screen for proj., $45. MO 9-1650.

SKIS: Hofbauer w/Dover bind., 205 cm lg., made in Bavaria, $15. 249-1070.

ICE SKATES: 3, sz. 6, 7 & 1, $15/ea., Canadian made. 231-6950.

INBD.: 13 ft. bass boat, $95. OR 1-1297.

SKIS: 2 pr. Northland, 6 ft. 3 in. lg., for adult 5 ft. 8 to 6 ft., Cubco bind., P-Tex btms., $20/pr.; 3 pr. lea. ski boots, sz. 8, 9, 9½ w/skis, $15, sep. $10 ea. 862-8030.

MAN'S RING: Sma. sz., star sapphire, 2 dia. chips, $95. 938-9358.

IGNITION: Capacitive discharge. Delta Mark 10, $27 w/group purch. 212 MO 3-7611, evgs.

ELEC. ORGAN: Wurlitzer mod. 4075, less than 1 yr., $1,100. 722-3571.

TVs: 21 in. Motorola w/o cab., & 9 in. G.E., fl. cons., $50/both. 929-4021.

SKIS: Hd., 200cm, comp. giant slalom w/Cook cable bind., $55; adult Shorty, 36 in., comp. w/ bind., $25. MO 9-1728, after 6.

CHEVELLE: '69 sta. wag., orig. owner, low mi., V-8 auto., pwr. steer., R&H, pwr. rear wind. 864-6649, after 6.

DODGE: '68 Coronet 500, 2-dr. hdtp., red/blk. vinyl tp., bkts., 235 hp, V-8, auto., pwr. steer., 2 new snows, $1,350. PE 5-4161.

CHEVELLE: '68, 2-dr. Malibu, pwr. glide, blk. vinyl tp., pushbtn. radio, rear spkr. & antenna post., rear defrost., new w/w & rear bumper guards, $1,695. SU 5-1038.

Boat show begins January 23

Grumman products will be well represented in the 61st annual National Boat Show to be held at the Coliseum, Columbus Circle, New York City, from January 23 through 31.

This is the daddy of all the boat shows and this year about 500 pleasure craft —ranging from canoes and dinghies to cruisers and yachts—will be on display on the five levels of the Coliseum.

And speaking of canoes, did you know that Grumman aluminum canoes have been around for 26 years? And that almost 200,000 have been built?

Three Indian-style (or "traditional") canoe models ranging in length from 13 feet to 17 feet will be exhibited. Prices? From $249 to $269 in the lightweight line, and $235 to $255 in the standard line.

Two square-stern models will be shown, too. One is a 17-footer for use with a small outboard. That sells for $285. The other is the 15-foot three-inch Sportcanoe, which can be paddled, rowed, sailed, or powered by outboards up to five horsepower. Sale price is $349.

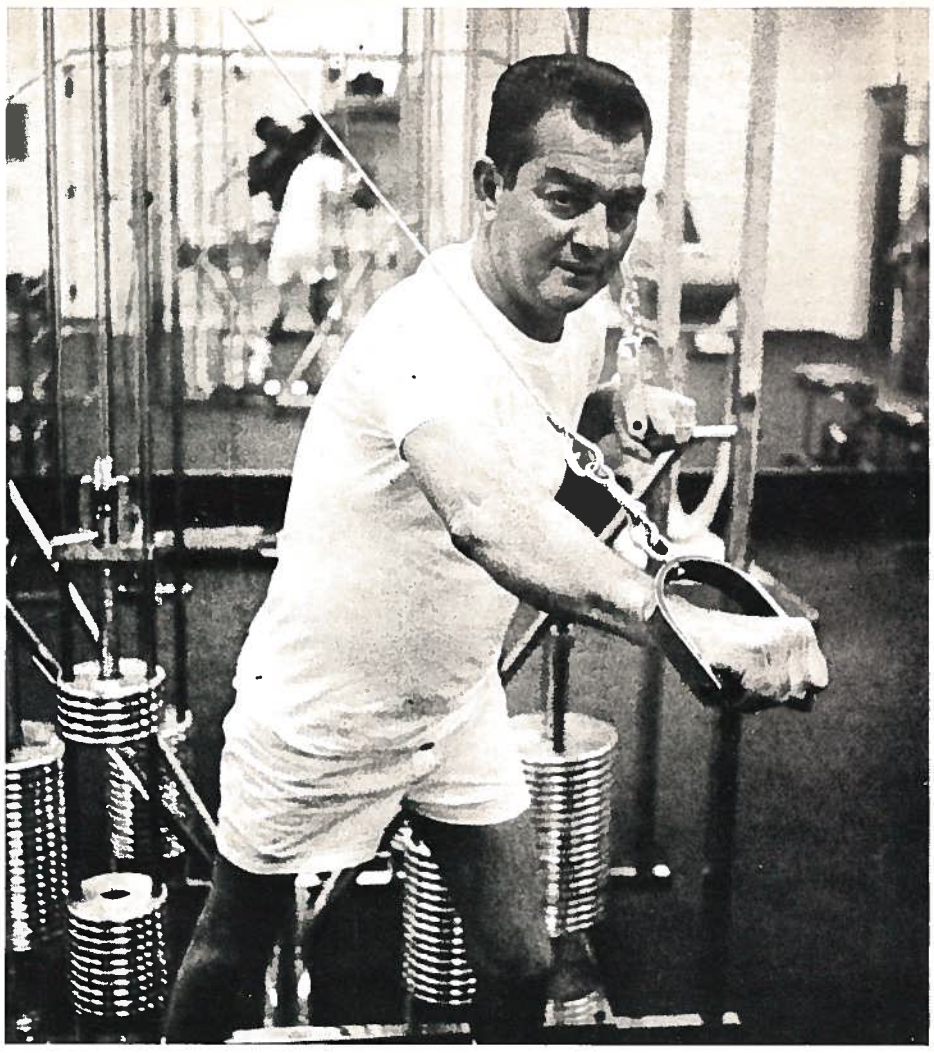
And there's also a 17-foot shoe keel (small-draft) model that weighs only 81 pounds and costs $280. Designed for white water, it has the traditional double-end shape.

If you're the type who goes for the big ones, well, the Pearson Yachts division of Grumman Allied Industries, Inc., has three on view. One is a new one—the Portsmouth 43, which sleeps six or eight. The 43 is a "hybrid" fiberglass powerboat that combines coastal-cruiser hull design and house yacht living area. The base price of $32,200 includes standard power of twin 212-horsepower gasoline engines.

The Pearson 39, unveiled last year, is a little over 39 feet long and spreads 673 square feet of sail on aluminum spars. She sleeps seven.

Then, after you've bought a canoe or a yacht (or both), look around at all the other beautiful boats. Tickets for children under 12 go for $1.50, and $2.75 for adults. Discount tickets ($1.50) for adults are available at Employee Services Offices.

From the 25th through the 29th, you can look around from noon to 10 p.m. Saturdays the hours are 10 a.m. to 10 p.m., and Sundays the hours are 1 p.m. to 7 p.m.



Workout. **'It's gonna be a great day' is Richie Cope's theme song these days. Thanks to the friends who donated 60 pints of blood, and to the surgeon who did the operation, Cope is enjoying a new heart and keeping it tuned up with a strict program of exercise.**

'Doing great' with new heart, Cope looks to homecoming

"Doing great" has been the word on Richie Cope of Machining Technical Services, Plant 6, ever since he got a new heart last October. "I'm coming home the end of this month," he reported by phone from California the other day. "Tell everybody how grateful I am to them and how glad I'll be to see my Grumman friends."

His friends' interest is more than perfunctory; they gave 60 pints of blood through the Red Cross when Cope had his heart transplant last October. They've deluged him with get-well wishes and Christmas cards and messages to cheer him on.

Rigid training

They're also proud of his accomplishments. The less athletic ones, who puff going upstairs, contemplate his daily regimen with awe: five to 10 miles on a bicycle; an hour and a half on the golf driving range every morning; 25 to 30 laps in a 50-foot swimming pool every afternoon; 25 to 50 situps a day. ("I was doing pushups, but the doctors made me quit because it was too much of a strain on my breastbone.") His weight is stabilized at 140 pounds and he sticks faithfully to a low sodium, low calorie, non-fat diet.

Cope welcomed the opportunity to receive a transplant, for he had had major surgery on his own imperfect heart three times in four years. "Grumman sent me to Mayo (the Mayo Clinic in Rochester, Minn.) in 1966 for an artery transplant, and the doctors gave me three months to live then," he recalls.

Two-month wait

The 45-year-old Cope waited for about two months in California last fall to receive, finally, the heart of an 18-year-old who had suffered brain damage. His was the 26th heart transplant performed by famed Dr. Norman Shumway, who is associated with the Stanford University Medical Center at Palo Alto. Nine of Dr. Shumway's transplant patients are living and one has survived two years thus far.

As an outpatient resident, with his wife, Adelaide, of the big Oak Creek Apartments near the hospital, Richie has made such progress in the past few weeks with his recuperation program that the committee representing Oak Creek's 1,000 residents decided to offer the use of their pool and other recreational facilities to **all** Stanford's heart transplant outpatients, Richie said. "That will be a great break for the patients," he declared.

The Copes live in East Patchogue. Richie's brother-in-law is Bill Hickey of Space Management & Staff, Plant 6.

Short shots

Senior Vice President Grant Hedrick named to receive the Sylvanus Albert Reed Award for "technical excellence, design innovation, and leadership in the structural development of several generations of aerospace vehicles." Hedrick will be presented the award at the AIAA Honors Banquet, January 27, at the Statler Hilton, New York. . . . Cdr. Chuck Moore, who was assigned to the Naval Plant Representatives' Office in Bethpage a couple of years ago, took over as skipper RVAW-110 at North Island recently. Chuck succeeds Cdr. Tom Overdorf—another Bethpage "resident" a few years ago—as head of the squadron that trains air crews for the Grumman E-2 airborne early warning aircraft for Air Wing 11.

At Pearl Harbor, Cdr. Doug McCrimmon became commanding officer of VA-52, taking over the A-6 squadron from Cdr. Bob Kobler. Cdr. Everett Rollins is executive officer of the attack squadron that flies from the carrier Kitty Hawk. McCrimmon spent two years at Patuxent River in the early sixties after graduating from the Navy's test pilot school at the Naval Air Test Center in Maryland. . . . Received letters from Percy Donley and Les Newlands—they say "thanks" to all their old co-workers on their retirement.

Scotty MacLeod's son Dave seems to be carrying on a family tradition. A couple of weeks ago, Dave, a graduate of Stony Brook U. and former all-around gymnastics champion in the state, was sworn in as a Naval Aviation Officer candidate. Scotty, who's a LM consulting pilot, was a naval aviator himself until he retired recently. . . . At Ken-

Barbara Martin

nedy Space Center, Barbara Martin receiving congratulations on being named first woman in Florida to qualify as senior dive instructor. Barbara, a secretary in Quality Control, has been SCUBA diving for some time, and is only the ninth woman in the country to be qualified for her present rating.

Training and Development offering after-hours courses to aid in career development; registration opens January 18

Leadership in the aerospace industry can result only through contributions from each employee, as a member of a team, in solving technological problems.

Early education, such as a high school diploma or college degree, is only a prelude to a program of continuing education that is required to sustain a productive career. This is especially important because of the rapid advances in technology and the broadening of many skills within our industry.

To assist Grumman personnel in continuing their personal development, we are offering courses as a supplement to those available at local colleges and in Adult Education Programs of local schools. Although many of the courses offer a means of expanding current knowledge, many others provide a valuable "refresher" in subjects studied in the past.

All Grumman employees are encouraged to take advantage of available educational opportunities which will assist them in accomplishing today's job and help them grow for tomorrow's opportunities.

Art Gilmore

Director, Corporate Training and Development

The courses listed are available to Grumman employees. For some courses there are prerequisites. Students need not have fulfilled a particular prerequisite by taking voluntary education courses; courses taken elsewhere or work experience can prepare a student for the more advanced courses.

For all courses, a minimum registration of 15 students is required; otherwise, the class will be cancelled.

Enrollment procedure

Enrollment is strictly voluntary. Students may register by calling the Voluntary Education Office at the extensions listed below. *Please note:* A specific phone extension is assigned for registrations for the day on which a course is given. The extension listed below which is prefixed by an asterisk (*) will be connected *only during the registration period.*

Registration calls will be accepted ONLY from 8:00 a.m., January 18, through 4:30 p.m., January 29, 1971 each working day.

Bethpage courses:

Monday evening courses	- call Ext. 87521*
Tuesday evening courses	- call Ext. 87522*
Wednesday evening courses	- call Ext. 84413
Thursday evening courses	- call Ext. 1282*
All Calverton evening courses	- call Ext. 381
To reserve Programmed Instruction Text	- call Ext. 84413

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Certificates

Certificates will be issued to those students who have attended at least 80% of the sessions and have completed the required work in a creditable manner. Further information can be obtained by calling the Voluntary Education Office on Ext. 84413.

Student cost

There are no fees or tuition charges. However, students are expected to purchase their own textbooks. Textbooks may be purchased anywhere, but for students' convenience, the Voluntary Education Office will have textbooks available for purchase through the course instructor.

A number of Programmed Instruction courses are being offered. As the texts used for Programmed Instruction are not reusable. a flat fee of $5 per Programmed Instruction text will be applied. Check or money order must be made payable to Grumman Aerospace Corporation. Programmed Instruction courses may be obtained at the Voluntary Education Office, Plant 38, Bethpage.

The following list of courses being offered by Corporate Training and Development includes title, course number, description of course, section number (if more than one section is being offered), instructor, location and time of class, and starting date. For registration, refer to title, course number, and section (if more than one class offered).

Computer Programming - COBOL (FF 00001 - 30 hrs)

This course covers the COBOL language and its application to business problems. Topics to be included are: organization of a COBOL program, fundamentals of flow charting, COBOL language

Offering computer programming, skills training courses . . .

structure and usage, review of compiler diagnostic messages, and class problems.

Prerequisite: Introduction to Computer Programming or equivalent.

Section 1 - B. Abrams, Room 110, Bethpage H.S., 5-7 p.m., Monday, February 22.

Section 2 - A. Pagoto, Room 110, Bethpage H.S., 5-7 p.m., Wednesday, February 17.

Section 3 - F. Hamilton, Room 1, Plant 6, 4:30-6:30 p.m., Wednesday, February 17.

Computer Programming - FORTRAN (FF 00002 - 30 hrs)

This course introduces the basic concepts of a digital computer and how to program it in FORTRAN. Completion of this course will enable the student to set up problems for solution on the computer using this language.

Prerequisites: Algebra.

Section 1 - J. Vosefski, Room 110, Bethpage H.S., 5-7 p.m., Tuesday, February 16.

Section 2 - R. Sacks, Room 110, Bethpage H.S., 5-7 p.m., Thursday, February 18.

Computer Programming, Introduction to (FF 00003 - 30 hrs)

Course is intended for those students who have had little or no exposure to computer programming, and intend to take programming courses devoted to a particular language.
Course includes: philosophies of programming, representation, presentation and transfer of information, problem analysis, program organization, coding and an introduction to FORTRAN, COBOL, ALGOC and PL/1.

Section 1 - G. DiBenedetto, Room 112, Bethpage H.S., 5-7 p.m., Thursday, February 18.

Section 2 - M. Blyseth, Room 5, Plant 38, 5-7 p.m., Tuesday, February 16.

Computer Logic II (FF 00526 - 30 hrs)

This course is intended as an introduction to the logic design of computers or switching systems. Emphasis is on sequential circuits, systems with memory.
The course covers asynchronous sequential circuits, synchronous sequential circuits, development of the flip-flop memory element, electronic logic elements, basic computer circuits, counters, accumulators, registers, parity checker and the general organization of a computer central processing unit.

Prerequisite: Computer Logic I or its equivalent.

M. Kesselman, Room 111, Bethpage H.S., 5-7 p.m., Tuesday, February 16.

Data Processing II (FF 00007 - 30 hrs)

This course covers an analysis of business data processing systems and their organization, case studies in retailing and manufacturing, flow charting, input-output devices, storage units, and management applications of data processing.

Prerequisite: Data Processing 1 or equivalent.

G. Shreve, Room 4, Plant 38, 5-7 p.m., Monday, February 22,

Numerical Controls II (FF 00047 - 30 hrs)

This course emphasizes the programming of numerically controlled machines utilizing the APT language. Practical problems will be introduced for programming by the students.

Prerequisite: Trigonometry.

P. Henstchel, Conf. Room "C," Plant 3, 5-7 p.m., Thursday, February 18.

Electricity II (FF 00009 - 30 hrs)

Electricity II is for those interested in the alternating current aspects of electricity. Topics of discussion and laboratory experimentation are: inductance, capacitance, LCR circuits and applications, resonant circuits and sources of A.C. generation.

Prerequisite: Electricity I or equivalent.

M. J. Hosek, Room 6, Plant 38, 5-7 p.m., Wednesday, February 17.

Electronics II (FF 00011 - 30 hrs)

Electronics II covers vacuum tubes, as applied to electronic circuits such as: D.C., A.C., Audio, paraphase, push-pull, and power amplifiers. Theory of circuit operations, laboratory experiments, and related test instruments are included in each session.

Prerequisite: Electronics I or equivalent.

S. Biesiadecki, Room 2, Plant 38, 5-7 p.m., Thursday, February 18.

Electronic Fabrication Techniques (FF 00307 - 40 hrs)

This course covers the basic skills necessary for an electronic shop assembly and fabrication technician. Also included are: nomenclature, tooling, material identification, and pertinent specifications used for electronic assembly and fabrication.
Attendees perform related practice following demonstrations of methods and techniques by the instructor.

W. Schnaderbeck, Room 7, Plant 38, 5-8 p.m., Monday, February 22.

Basics of Prototype Chassis Wiring (FF 00705 - 30 hrs)

This course consists of introductory knowledge and fundamental skills required for the fabrication of prototype electronics chassis wiring. The course includes: electronic component symbols and their physical characteristics, interpretations of schematic diagrams, and the fabrication of typical electronic prototype circuits, on an electronic chassis, from schematics.

Prerequisite: Electronic Fabrication Techniques (or equivalent).

P. Pantelis, Room 7, Plant 38, 5-7 p.m., Tuesday, February 16.

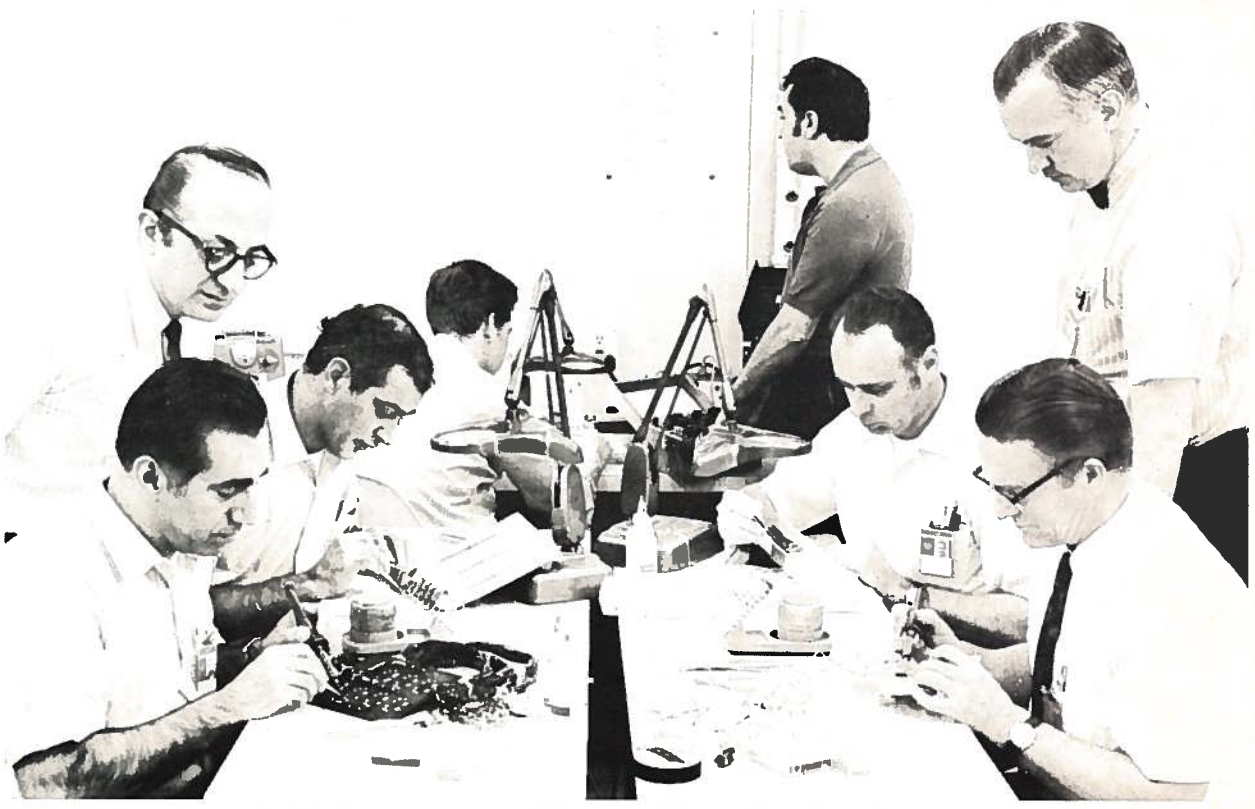
Use, Care and Application of Basic Electronic Instruments (FF 00706 - 30 hrs)

Selection, operation, reading, precautions and safety rules for the measurement of voltages and currents are demonstrated. Attendees practice on "live" circuits that are properly operating.
The test instruments used in the course include: volt, ohm, milliammeters, tube and transistor checkers, audio and radio frequency oscillators, oscilloscopes, wavemeters, and grid-dip-oscillators. Typical circuits tested are: power supplies and those usually found in superheterodynes.

R. Volino, Plant 6, 4:30-6:30 p.m., Monday, February 22.

Integrated Circuits for Engineers (FF 00329 - 30 hrs)

Introduction to integrated circuits manufacture and techniques, their use in logic and computer design, microcircuit families, and linear circuits. The objectives of the course are to answer such basic questions as: What are the IC? How are they applied in the military and industrial consumer fields? What can the ICs do? What are the limitations of ICs?
The engineer using ICs should know the costs versus results obtained as well as inputs and outputs



of ICs. He should also know what testing and fault isolating techniques can be used without impairing the IC.

Prerequisite: Transistor for Engineers I or II (or equivalent).

V. Sanford, Room 6, Plant 38, 5-7 p.m., Tuesday, February 16.

Manufacturing Methods II (FF 00043 - 30 hrs)

This course is a continuation of Manufacturing Methods I and will cover: tool order, tool route cards, operation sheets, introduction to the automated system of operation, aircraft lines drawing as related to tooling, configuration, and several shop tours.

Prerequisite: Manufacturing Methods or equivalent.

P. Bernardo, Room 1, Plant 38, 5-7 p.m., Monday, February 22.

Laser Technology (FF 00528 - 26 hrs)

This course is designed for engineering personnel to give them an understanding of lasers and laser systems. Lectures will include: laser background, types of lasers, nonlinear optics, holography, laser characteristics, laser scanning systems, and ancillary system elements.

Prerequisite: Engineering degree.

Section 1 - K. Leib, Conf. Room 1 & 2, Plant 14, 5-7 p.m., Tuesday, February 16.

Section 2 - K. Leib, Conf. Room 1 & 2, Plant 14, 5-7 p.m., Wednesday, February 17.

Linear Control Systems (FF 00070 - 30 hrs)

This course is designed for those with an engineering or science degree. The subject matter discussed in this course will include the mathematical modeling of linear control systems and the analysis of these systems using both time and frequency domain techniques.

Prerequisite: Differential Equations.

R. Quinn, Room 111, Bethpage H.S., 5-7 p.m., Wednesday, February 17.

Fundamentals of Fluidics (FF 00707 - 30 hrs)

This course is designed for those with an engineering background. Topics to be covered include: principle of operation, digital and analog fluidic components, fluidic sensors, interface devices and applications.

Prerequisite: Basic Physics.

M. Cycon, Jr., Room 5, Plant 38, 5-7 p.m., Monday, February 22.

Basic Stress (FF 00708 - 30 hrs)

Grumman employees involved in the preliminary layout of structural components are instructed in the elementary methods of stress analysis. Simple calculations that will allow them to size such structural elements as beams, stringers, shear panels, etc., so that the stress engineer can better finalize the product. New employees will be indoctrinated in the analysis of thin gage, light-weight components.

Prerequisite: High school math to Trigonometry.

O. Lourenso, Room 114, Bethpage H.S., 5-7 p.m., Tuesday, February 16.

Cryogenic Engineering (FF 00710 - 34 hrs)

This course introduces the basic concepts of low temperature engineering, with heavy emphasis in the use of hydrogen and oxygen technology for both space and earth applications. Course includes: thermo-dynamics fundamentals, properties of materials, vacuum technology, fluid flow, heat transfer, test operations and safety.

Prerequisite: Engineering degree or equivalent.

W. Contrearas, Room 113, Bethpage H.S., 5-7 p.m., Monday, February 22.

Stress Review for Engineers (FF 00709 - 30 hrs)

The analysis of complicated structural components and assemblies such as bulkheads, fuselages, wings, and related connections. Advanced methods of stress analysis are used employing strain energy, virtual work, elastic centers. These complicated problems are computer oriented and are also analyzed by matrix and computer problems.

Prerequisite: Engineering degree or equivalent.

O. Lourenso, Room 111, Bethpage H.S., 5-7 p.m., Thursday, February 18.

Blueprint Reading, Basic (FF 00048 - 24 hrs)

This course covers interpretation of an engineering drawing, dimensions and tolerances, surface finishes, bill of materials, drawing notes, manufacturing processes, and selected shop tours.

J. Eltman, Room 2, Plant 38, 5-7 p.m., Tuesday, February 16.

Measurement Lab I (FF 00151 - 30 hrs)

This course is designed to provide the student with a basic understanding of precision measurement—the tools, instruments, and methods employed—and its importance to the mechanical field. The student will be taught the use of scaled instruments, micrometers, calipers, gages, indicators, and the various supporting tools used in conjunction with precision measurement.

J. Eltman, Room 18, Plant 38, 5-7 p.m., Monday, February 22.

Aerospace Mechanics I (FF 00699 - 60 hrs)

This course will furnish beginning students of airframe construction with the basic skills and knowledge required for sheetmetal parts and assembly fabrication through hands-on skills training. The course includes flat pattern layout, drilling, riveting, and assembly techniques.

D. Warner, Shop 8, Plant 38, 5-9 p.m., Monday, February 22.

Machine Shop I (FF 00688 - 60 hrs)

A basic course covering one of the main areas of machine shop practice: bench work. The course includes training in the use of hand, layout, and measuring tools used at the bench for those who have had little or no previous experience in the mechanical field. Included are student projects involving sawing, filing, drilling, sanding, tapping, and other bench operations.

H. Brochyus, Shop 8, Plant 38, 5-9 p.m., Monday, February 22.

Introduction to Hydraulics (FF 00039 - 30 hrs)

This course covers the development of basic hydraulic systems, including the basic physics which govern fluids, prints, hydraulic fittings, components, and lab work.

Prerequisite: Basic Mathematics.

E. Baumgart, Room 18, Plant 38, 5-7 p.m., Wednesday, February 17.

Reading Improvement (FF 00020 - 33 hrs)

This course is designed for the average or above - average reader who wishes to read more efficiently. Through systematic classroom exercises, the

student will substantially increase his reading speed and comprehension.

Section 1 - L. Kess, Room 3, Plant 38, 5-7 p.m., Wednesday, February 17.

Section 2 - G. Ballard, Room 3, Plant 38, 5-7 p.m., Thursday, February 18.

Reading Workshop (FF 00260 - 45 hrs)

This course is designed to aid individuals to improve reading rate and comprehension. Each students sets his own pace. This program provides an enjoyable method of learning reading skills and even improving spelling. It is a self motivating program.

E. Baumgart, Room 14, Plant 38, 5-7 p.m., Tuesday, February 16.

High School Equivalency (FF 00016 - 60 hrs)

This course provides instruction, review, and preparation for taking the High School Equivalency test. Major areas of concentration are: Mathematics, Sciences, English, and Social Studies. All applicants will be pre-tested prior to being admitted to the course.

Prerequisite: 18 years of age or older; out of school at least one year.

Bethpage High School instructor, Room 107, Bethpage H.S., 5-7 p.m., Monday, February 22.

Effective Technical Presentations (FF 00019 - 30 hrs)

A course to prepare engineering and administrative personnel to give brief, coherent, and successful oral presentations. Subject matter includes tailoring a presentation to a specific audience, organizing material for most effectiveness, selection and preparation of visual aids and platform techniques. Each student will participate in practice presentations and class critiques.

G. Breen, Room 4, Plant 38, 5-7 p.m., Tuesday, February 16.

Shorthand, Gregg Refresher (FF 00023 - 30 hrs)

A course designed for the individual who wishes to refresh or rebuild skills in shorthand. Provides dictation and transcription practice geared to industrial requirements.

M. Wolfe, Room 113, Bethpage H.S., 5-7 p.m., Wednesday, February 17.

Shorthand, Gregg Basic (FF 00835 - 30 hrs)

A course designed for the individual who wishes to build skills in shorthand. Provides dictation and transcription practice geared to industrial requirements.

Y. DeJesus, Plant 6, Calverton, 4:30-6:30 p.m., Tuesday, February 16.

Stenoscript II (FF 00029 - 30 hrs)

This course is a continuation of Stenoscript I. Through basic dictation drills the participants will develop the ability to take dictation at 90 words per minute.

Prerequisite: Stenoscript I.

M. Cooke, Room 2, Plant 38, 5-7 p.m., Monday, February 22.

Typing, Beginners (FF 00030 - 30 hrs)

This course is for those who desire a skill in typing. Through regular classroom practice and drill, students will acquire the necessary keyboard control essential to good typing techniques.

Bethpage High School instructor, Room 109, Bethpage H.S., 5-7 p.m., Monday, February 22.

Typing, Intermediate (FF 00837 - 30 hrs)

Intermediate students will have their typing techniques diagnosed and a program of remedial or advanced instruction will be programmed.

Prerequisite: Beginners Typing.

Bethpage High School instructor, Room 109, Bethpage H.S., 5-7 p.m., Tuesday, February 16.

Written Communications (FF 00838 - 30 hrs)

A workshop course in which students are given a variety of situations which require different types of writing (e.g., letters, AVO's, reports, definitions, procedures, proposals, etc.). The writings are edited and discussed individually with students. Brief lectures on writing basics are given.

R. Tynan, Room 114, Bethpage H.S., 5-7 p.m., Wednesday, February 17.

Home studies

For those who are unable to take advantage of the Voluntary Education program after normal working hours, the following Programmed Instruction (P.I.) courses are being made available, in limited numbers. The following courses are self-teaching programs. Certificates will be awarded those who complete the course in satisfactory manner. (Fee $5 per course.)

Introduction to Electronic Data Processing
Pressure & Its Measurement
Liquid Level Measurement - Part I
Improving Your Written Communications
Methods Improvement and Work Controls
The Secretary - Jill of all Trades
Cutting Office Costs Through Work Simplification
Trigonometry - A Practical Course
The Arithmetic of Computers